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Insecutor Inscitiae Menstruus

VOL. XI

JANUARY-MARCH, 1923

Nos. 1-3

THE NORTH AMERICAN SHORT-WINGED PSYCHIDAE

(*Lepidoptera*)

By HARRISON G. DYAR

In revising this family, with Mr. Neumoegen, over a quarter of a century ago, I placed *Platoeceticus* Packard as having vein 6 absent in the hind wing. Further material shows that this condition is exceptional, the majority of specimens having vein 6 present on both wings. Vein 6, when consistently absent, is absent on both wings. This reduces the number of our genera by one; furthermore, there are older names given to European species for both of the remaining genera in this group.

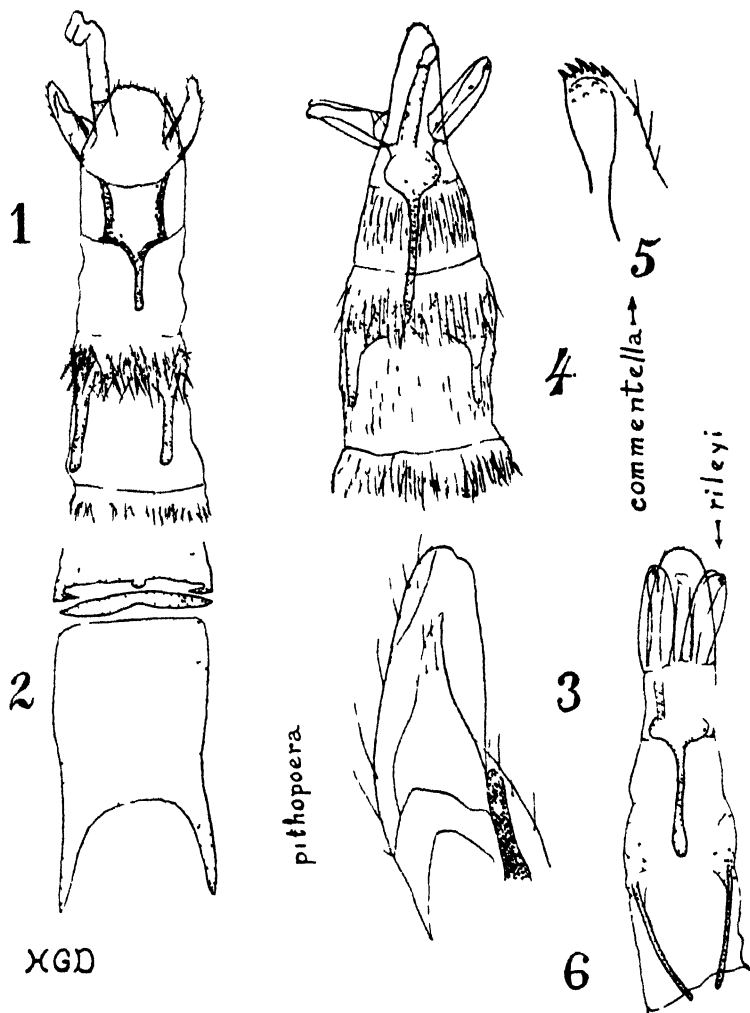
In the other group, in which vein 1^a of fore wing is obsolete between vein 1^b and the inner margin, was contained *Chalia rileyi* Heylaerts. This species cannot rest in *Chalia*, which is unrepresented with us, but may find place in *Apterona* Millière.

Prochalia pygmaea Barnes & McDunnough, about which a warm controversy raged at the time of its description, proves to be distinct from the more northerly distributed form which resembles it, as the latter has lost vein 9 in the fore wings. A new name is suggested for this.

KEY TO THE GENERA OF NORTH AMERICAN PSYCHIDAE (EXCEPT OIKETICUS GROUP)

Vein 1^a of fore wing anastomosing with 1^b and running to the inner margin.

Fore wing with 12 veins; hind wing with 8 veins (vein 7 of fore wing free or stalked with 8-9; vein 6 of hind wing rarely absent),
Psyche Schrank (1802), *Platoeceticus* Packard (1869), *Manatha* Moore (1877).



EXPLANATION OF PLATE I

- Fig 1 *Pachytelia pithopoera* Dyar, last three abdominal segments.
 Fig 2 The same, ventral basal abdominal plate
 Fig 3 The same, clasper, more enlarged than in fig 1.
 Fig 4 *Zamopsysche commentella* Dyar, last three abdominal segments
 Fig. 5 The same, clasper, more enlarged than in fig. 4.
 Fig 6 *Apterona rileyi* Heylaerts, last three abdominal segments.

Fore wing with 11 veins; hind wing with 7 veins (hind wing with an oblique bar or anastomosis between veins 7-8 near middle of cell),

Pachytelia Westwood (1848), *Hyaloscotes* Butler (1881), *Eurycyttarus* Hampson (1891).

Vein 1^a of fore wing obsolete between 1^b and inner margin.

Fore wing with 12 veins (vein 9 present); hind wing with 8 veins.

All the veins from the cell.....**Oedonia** Kirby

Veins 7-8 of fore wing shortly stalked,

Prochalia Barnes & McDunnough

Fore wing with 11 veins (vein 9 absent); hind wing with 8 veins,

Zamopsyche Dyar

Fore wing with 10 veins; hind wing with 7 veins..**Apterona** Millière

Pachytelia confederata Grote & Robinson.

Originally described from Texas, ranging as far northward as Maryland. The peculiar cases, longitudinally thatched with narrow grass-stems, are well known. No material from Texas is before me, all of the specimens originally collected by Bel-frage in Clifton, Bosque County, being *carbonaria*, so that perhaps this name is misapplied.

Pachytelia carbonaria Packard.

Larger than *confederata*, and known only from Texas at present. The larval case is unknown.

Pachytelia traceyi Jones.

The robust body and short wings easily indicate this species. The larval cases are covered with broad flat grass-blades.

Pachytelia celibata Jones.

This and the following were very recently characterized by Mr. Jones under *Psyche* (*Eurycyttarus*). In both of them, vein 8 of hind wings joins vein 7 by a broad anastomosis instead of a bar, as in the other species of the genus.

Pachytelia cacocnemos Jones.

Superficially like *traceyi*, but differing in structural details.

Pachytelia fragmentella Hy. Edwards.

Described from the larval case, Strawberry Valley, Siskiyou

County, California, covered with pieces of (pine) leaves and bark. The *coniferella* of this same author, found in Grass Valley, California, "on palings and trunks of pines," is presumably the same. The adult is undoubtedly the one described by Butler as *Hyaloscotes fumosa*, the type being from Mount Shasta, and four males from Siskiyou County, California, as I was informed by Sir George Hampson many years ago. I have a larval case from Easton, Washington, which is covered with fragments of spruce leaves, but may nevertheless be this species. No adults are before me.

***Pachytelia pithopoera*, new species.**

Wings thinly scaled, gray, without markings. Veins 1^a and 1^b anastomosing shortly before vein 1^a branches to the inner margin. Expanse, 20 mm.

The hypopygium (pl. I, fig. 1) has the plate of the ninth segment quadrate, with a central rod reaching two-thirds of the internode. Internodes 8-9 and 7-8 bare. Plate of the eighth segment with two rather long, widely separated rods. Claspers simple, the inner division pointed and without teeth (pl. I, fig. 3). Basal ventral abdominal plate (pl. I, fig. 2) with long basal horns, followed by a small narrow plate before the plate of the third segment, which is indented on the anterior margin.

Type, male, U. S. Nat. Mus.; Collins, Idaho, July 27, 1898 (C. V. Piper).

Formerly identified as *Psyche fragmentella*, but in the adult of that (*Hyaloscotes fumosa*) vein 1^a does not anastomose with 1^b, but is joined to it by a bar, as indicated by a sketch made for me by Sir George Hampson.

The case of *pithopoera* is covered with rather flat grass-blades, laid on lengthwise.

Two other cases are before me, Blue Mountains, Washington, July 15, 1896 (C. V. Piper), which are covered with grass-blades and pieces of leaves (perhaps *Eriogonum*). Without adults, nothing certain can be said of them.

***Psyche gloveri* Packard.**

I formerly referred *Manatha edwardsii* Heylaerts to this species (in 1893); but perhaps the name refers to *carbonarius*. Barnes and Benjamin have recently described *Manatha jonesi*, in which the antennae are said to be more shortly pectinated. I cannot perceive any tangible difference in this respect in my material. I have no specimens from San Benito, Texas, which they make the type locality; but I have specimens from Brownsville, Texas, which is in the same region. I am inclined to surmise that *jonesi* may be the same as *gloveri* or *nigrita*, according to what the larval cases may be found to be.

The larval case of *gloveri* is characteristic, being covered with very small fragments of bark and leaves.

***Psyche nigrita* Barnes & McDunnough.**

There is no tangible difference in the adults; but the larval cases are covered with long narrow grass-blades, densely applied.

***Oedonia exigua* Hly. Edwards.**

This species has not recurred. It may not belong to this family.

***Prochalia pygmaea* Barnes & McDunnough.**

Apparently similar to the following, except in venation. Described from Everglade, Florida, the larval sacks on the trunks of orange trees, which were covered with lichens.

***Zamopsyche commentella*, new genus and species.**

Fore wing with vein 1 without a branch; veins 2-6 separately from the cell, 7-8 shortly stalked, 9 absent, 10 and 11 from the cell. Hind wing with 2 and 3 from the cell, 4 5 connate at origin, 6 and 7 from the cell, 8 jointed by a weak oblique bar toward the middle of the cell. Wings elongate and rather narrow; body slender. Subtranslucent blackish brown with slight bronzy tint. Expanse, 13 mm.

The hypopygium (pl. I, fig. 4) has the plate of the ninth segment rounded, with a long rod which crosses the internode

and projects into the eighth segment. Internodes clothed with fine vestiture. Plate of the eighth segment with two distant and rather short rods. Clasper with the inner portion toothed (pl. I, fig. 5).

The larval sack is cylindrical, mixed with excrement and a few fragments of bark adhering to the outside.

Types, two males, U. S. Nat. Mus.; Vienna, Virginia, September 28, 1911, larval case on apple-bark (R. A. Cushman); Whitaker, South Carolina, "on elm" (E. S. G. Titus).

***Apterona rileyi* Heylaerts.**

I have a specimen which appears to agree entirely with the original description, Kearney, Virginia, collected on *Quercus marylandica* (A. Busck), the adult issued June 18, 1914 (C. Heinrich). The wings are of the usual shape, broadly rounded.

The hypopygium (pl. I, fig. 6) has the plate of the ninth segment broad, distinct only anteriorly, with rounded margins and a very long central rod running back almost to the internode 7-8. Plate of the eighth segment weak, the rods long and very slender. Inner division of the clasper strongly toothed. The internodes appear to be bare; but as the specimen was denuded before mounting, this cannot be positively stated.

***Apterona fragilis* Barnes & McDunnough.**

Described from Arizona, and not known to me in nature.

NOTE ON CUCULLIA ALFARATA

(*Lepidoptera, Noctuidae*)

By HARRISON G DYAR

***Cucullia alfarata* Strecker.**

Cucullia alfarata Strecker, Lep. Roph. & Het., Suppl. 1, 9, 1898.

Copicucullia alfarata Dyar, Bull. 52, U. S. Nat. Mus., 173, 1903.

Copicucullia alfarata Hampson, Cat. Lep. Phal. Brit. Mus., vi, 11, 1906.

Cucullia phila Smith, Ann. N. Y. Acad. Sci., xviii, 117, 1908.

Copicucullia alfarata Barnes & McDunnough, Check List Lep. Bor. Am., 55, 1917.

Cucullia phila Barnes & McDunnough, Check List Lep. Bor. Am., 55, 1917.

Strecker described from Florida, Smith from Pennsylvania. The mistaken reference to *Copicucullia* has prevented the recognition of the species and caused the redescription by Smith. Specimens are in the National Museum from Tryon, North Carolina, August 8, 1904 (W. F. Fiske), Raleigh, North Carolina, August, 1911 (C. S. Brimley), Clarksville, Tennessee, August 6, 1922 (S. E. Crumb), Cadet, Missouri, August 11, 1890 (J. G. Barlow), and Glencarlyn, Virginia (H. S. Barber), the latter being a larva, which matured on October 10, 1922.

The larvae feed on wild aster, and are conspicuous late in the fall eating the flowers and seed-pods. The species is single-brooded, larvae maturing in late September and early October, not appearing as moths until August of the following year.

Larvae sent to the Bureau of Entomology by J. G. Barlow in the fall of 1889 were briefly described by the late Theodore Pergande as follows:

"Length $1\frac{1}{2}$ inches. Head and body shining. Color black, orange and lemon yellow and white. Head black, with a triangle in front, large spot on cheek, and antennae except apical joint, white. Body with a wide dorsal orange stripe lighter (lemon yellow) between segments, extending from the head to anus, but narrowly interrupted with black on shield of first segment; then a wide black stripe, reaching to and including the stigmata. The lower half of this stripe is interrupted by transverse lemon yellow spots, three or four to each segment. Then follows a substigmatal stripe uniformly orange, and much darker than the dorsal stripe; venter and feet white with black markings."

The larva collected by Mr. Barber last fall was noted as follows:

Head rounded, the vertex beneath joint 2, pale green on the sides, with diffuse black bars; face black, a broad, pale green inverted V-mark over clypeus; epistoma pale green. Antennae pale. Skin dull, wrinkled-shagreened. A broad bright orange-red dorsal band, constricted on joint 2 and on

the hump on joint 12; subdorsal area black, running down broadly to the spiracles, and narrowly anteriorly and posteriorly on the segments, between these black bars, pale green. A broad bright orange-red substigmatal line, slightly waved on the segments, without border, but with black on the tubercles and bars in the incisures anteriorly and posteriorly. Venter and feet pale pea-green. The pale green lateral area runs up to the dorsal red line on joint 2 (anteriorly and posteriorly), 12, 13 and 14. Tubercles invisible.

A NEW MEGARHINUS FROM SURINAM

(*Diptera, Culicidae*)

BY J. BONNE-WEPSTER AND C. BONNE

Megarhinus moengoensis, new species.

Female: Proboscis long, slender, pointed, curved. Palpi long and stout, about two-thirds of the proboscis. Terminal segment minute; vestiture metallic blue and purple, the apices of the segments light violet, golden scales beneath and on sides, except on basal section of the palpi which is blue and purple all round. Occiput covered with flat irregular light green and blue iridescent scales, ocular margins, cheeks and head beneath silver scaled.

Prothoracic lobes with flat silvery blue scales and a few setae. Mesonotum clothed with small brown scales on disk, the lateral margins, a median stripe in front and the complete posterior part with metallic green and blue scales. A patch of blue scales in front of the wings. Scutellum with greenish silver scales. Postnotum brown, nude. Pleurae and coxae brown, densely covered with silvery scales.

Abdomen subcylindrical, broadest at middle; dorsal vestiture basally olive green, fifth segment with golden blue scales, following segments deep blue with golden scales apically; venter with golden scales and a narrow blue longitudinal median stripe, widest on fourth and fifth segment, disappearing on eighth segment.

Wings narrow with smoky tinge, cross veins close together; a few blue scales at the base of the wing. Halteres with white knobs.

Legs slender, vestiture steel blue; femora brassy beneath. Front tarsi with clear white scales on inner side of second and base of third joint; mid tarsi with distinct white scales on second and basal two-thirds of third joint all round, apical third of third and basal half of fourth joint on one side only; hind tarsi with white scales on fourth and basal half of fifth joint all round.

Length about 7 mm.; wing 7 mm.

Male: Proboscis long and curved, pointed. Palpi very long, longer than the proboscis; terminal joint long and slender, slightly curved and tapering to a point; vestiture metallic violet and purple with a sprinkling of brassy scales, apices of all but last joint pale violet scaled, beneath all but last joint mostly brassy scaled. Vestiture of mesonotum predominatingly dark metallic blue with subdorsal coppery stripes. Scutellum covered with greenish blue scales. Abdomen deep blue at base, shading into reddish purple on sixth, seventh and eighth segments, venter golden scaled with median blue line; lateral ciliation short. Wings narrow, smoky. Legs slender, vestiture dark metallic purple and violet; femora brassy beneath; mid tarsi with faint bluish white scales on upper side of second, basal third of third joint; hind tarsi with fourth joint white all round, fifth joint entirely blue. Claw formula 1.0-1.0-0.0.

Length about 7 mm.; wing 7 mm.

Hypopygium: Side piece slender, nearly three times as long as broad; clasper slender, as long as the side piece, with long terminal spine and several small hairs on inner side of outer half. Basal lobes distinct, with an apical strong hair, much longer than the width of the side piece at this height; a second subapical strong hair more laterally, smaller hairs besides. Tenth sternites strongly chitinized, simple. Aedoeagus with simple slender mesosome, toothed on inner side, parameres well developed with thumblike projection. Basal plates bent down-

ward to meet parameres. Apodeme connection very narrow. Lobes of ninth tergite connected by a broadening of the tergite, with flat margin. Hairs of the lobes several, small, pointing laterally and outwardly.

Larva: Head shorter than wide, sides bulging. Antennae with very short terminal digits and a few tiny hairs on the shaft. Front margin arcuate. Mandible with five teeth, the first very strong, the third and fifth smallest, a row of setae near. Body smooth. Air tube short, stout, not even twice as long as wide, conical, no pecten, a small tuft basally. A plate on sides of eighth segment with two stout ciliate hairs on outer margin. Anal segment shorter than wide, ringed by the plate, which has spinules on its posterior margin; dorsal tufts a long brush on each side; a single spinulose lateral hair; ventral brush well developed. Anal gills short, bud-shaped.

This species is closely related to *Megarhinus trinidadensis* Dyar and Knab and *Megarhinus moctezuma* Dyar and Knab. It differs from *trinidadensis* in the male by the white on the hind legs, which is only present on the fourth tarsal segment instead of on the fourth and fifth, in the female by the white on the mid legs extending on the fourth tarsal joint. *Moctezuma* is only reported so far from Mexico and Central America. The typical ring on the hind legs of the male on the fourth tarsal joint is present in both species, also the mid tarsi have the same white mark. The hypopygium of the male *moengoensis* is very much like *trinidadensis*, however, and differs from *moctezuma*. The female *moengoensis* has two and a half segments of the mid tarsi white, the female *moctezuma* only one and a half.

Larvae were found at Moengo, Surinam, feeding on *Cleobonuca occulta* in the liquid between the leaf cases of *Heliconia* and *Ravenala*.

A NOTE ON DATANA PERSPICUA

(Lepidoptera, Notodontidae)

BY HARRISON G. DYAR

About 25 years ago Professor Cockerell applied the name *mesillae* to the form of *perspicua* Grote & Robinson which he found at Mesilla, New Mexico. There was no difference in the adults from normal *perspicua*, but the larvae were said to differ, resembling *ministra*, which is to say that the ground color was blacker and the lines narrower than usual. I see no reason to separate this from *robusta* Strecker, the larva of which has not been described; but Texas specimens before me, from the same region as Strecker's types, are easily covered by the ordinary variation of *perspicua*.

More recent collections show that the species extends into Arizona and southern California, the forms from these regions possessing more marked differences, and also showing a peculiar dimorphism. I arrange the forms as follows:

***Datana perspicua perspicua* G. & R.**

Datana perspicua Grote & Robinson, Proc. Ent. Soc. Phil., iv, 489, 1865.

Ranges from New York to the Gulf States and Kansas.

***Datana perspicua robusta* Streck.**

Datana robusta Strecker, Lep. Roph. & Het., 131, 1872.

Datana perspicua mesillae Cockerell, Psyche, viii, 41, 1897.

Texas and New Mexico.

***Datana perspicua discalis*, new subspecies.**

As in normal *perspicua*, but the whole fore wing evenly and rather densely irrorated with brown scales; reniform a conspicuous brown blotch; subapical streak broad, diffused; some purplish scaling at base of wing within the inner line; outer line distinct, rigid; median and faint extra-median lines normal.

The larva has the ground-color black, the lines narrow, thus resembling the larva of *perspicua robusta*.

Types, two males, No. 25799, U. S. Nat. Mus.; San Diego, California, September 1, 1906 (G. H. Field).

Dimorphic form **infusa**, new.

Fore wing solidly irrorate with dark brown, appearing of this color; inner and outer lines defined by their pale edges; two central lines faint, dark; discal mark distinct, but diffused; subapical line lost.

Types, two males, No. 25800, U. S. Nat. Mus.; San Diego, California, August 28, 1919 (K. R. Coolidge).

Datana perspicua cileena, new subspecies.

Much as in *perspicua discalis*; fore wing more smoothly and finely irrorated, the discal mark smaller and more discrete; lines distinct, slender, the subapical streak lost. The insect has a smoother, neater appearance than usual, the ordinary *perspicua*-habitus largely lost.

Types, two males, No. 25801, U. S. Nat. Mus.; Washington Mountains, Arizona (gift of B. Preston Clark); southern Arizona (E. J. Oslar).

Dimorphic form **perfusa**, new.

Fore wing suffused with brown, not as dark as *infusa* but more complete, the lines barely traceable, discal mark absent. Fore wing thus uniformly light brown, with faint traces of inner and outer darker lines. The female is lighter, pale tan, finely and lightly irrorated with brown; outer margin and apex tinged with brown. Inner and outer lines faint; median fainter and extra-median a trace; no discal marks. Except that I have *cileena* from the same collecting, I would be inclined to regard this as specifically distinct.

Types, male and female, No. 25802, U. S. Nat. Mus.; southern Arizona (E. J. Oslar). Unfortunately, Mr. Oslar's specimens are without exact data.

NEW AMERICAN LEPIDOPTERA

By HARRISON G. DYAR

Family HESPERIIDAE

Systasea microsticta, new species.

Fore wing entire, gray-brown with a bronzy reflection; a median band of semihyaline white spots, from costa directed toward tornus, two small at end of cell, a narrow one out of line, a narrow constricted one between veins 2 and 3 and small one below; a costo-subapical row of three small spots, before which on the costa is a black shade; a similar black shade precedes the median row of spots on the costa; a subterminal shaded black line, forming a large quadrate blotch on tornus. Hind wing the color of fore wing, the sprinkling of white scales less through the center of the wing; a subbasal, median and outer band, each composed of two well-separated black lines, the spaces between slightly more whitish than the rest of the wing. Outer margin excavate opposite discal fold. Beneath the wings are shaded with light reddish; markings repeated, the fore wing rather broadly white along inner margin. Hind wing with the double bands reddish filled, and showing more distinctly than above a submarginal macular blackish one, with a black spot before tornus. Expanse, 28 mm.

Type, No. 25805, U. S. Nat. Mus.; Guerrero, Mexico, May, 1922 (R. Müller).

Amblyscirtes mate, new species.

Black above with bronzy reflection and a light sprinkling of pale scales; fringe pale, dark-checked at the ends of the veins. Below more heavily white-sprinkled, but without other difference. Expanse, 25 mm. The antennae are finely ringed with white, and with a white mark below before the black club.

Type, No. 25806, U. S. Nat. Mus.; Guerrero, Mexico, May, 1922 (R. Müller).

Family ARCTIIDAE

Arctia caja virginivir, new subspecies.

Small, fore wings with the markings of *caja caja* Linn.

(Europe) in the male, not so much broken across as to the white as in *caja phacosoma* Butler; in the female the white is extensive, so that the wings look white with oval brown spots, in four irregular bands and two angular ones on the margin. Hind wings red, the black spots as usual, but rather narrow, not so full and round as in *caja* and *phaeosoma*. Expanse, male, 43–49 mm.; female, 53 mm.

Types, male and female, paratypes, two males and female, U. S. Nat. Mus.; "Alaska," without exact data, but probably from one of the coastal islands.

The females indicate a transition toward *caja opulenta* Edwards from the Yukon Valley. In the females the accessory cell of fore wing is wanting, vein 10 being free, from the cell. On this account Mr. Wm. T. M. Forbes, who examined the material some years ago, attached a label "N. gen.?, n. sp." However, in all the males the accessory cell is present; in two of them the anastomosis is abnormally near the cell, but in the third is in the normal position. I think, therefore, that the absence of the anastomosis in the females is a matter of variation, and does not indicate either specific or generic rank. As a subspecies, however, the form seems well defined.

***Arctia caja parva* Rothschild.**

A single female which agrees well with this race, described from Labrador, was brought home by Dr. J. M. Aldrich, caught by members of his party on a mountain at Windy Station on the Alaska Railroad, July 10, 1921.

Family NOLIDAE

***Celama eurypennis*, new species.**

White. Markings brownish black; a subbasal subcostal raised dot; a costal dot beyond it; costa finely flecked; an inner row of three dots across the wing; discal mark large, raised, joined to costa; an outer line, forming dots on the veins, slightly excurved over cell and a little indentation on submedian fold; a broadly wavy faint brown subterminal line; a terminal row

of shaded dots. Hind wing with a little brown tint on the veins and outwardly. Expanse, 22 mm.

Type, male, No. 25807, U. S. Nat. Mus.; Provo, Utah, July 27, 1908 (T. Spaulding).

***Roeselia minuscula eucalyptula*, new subspecies**

Larger and paler than *minuscula minuscula*, the hind wings almost white, with a faint discal dot. Expanse, 21–24 mm.

Types, three males, No. 25808, U. S. Nat. Mus.; Claremont, California (C. W. Metz); San Diego, California, May 15, 1912 (G. H. Field); San Diego, California, March 1, 1920 (K. R. Coolidge).

***Roeselia minuscula fuscula* Grote.**

Larger and darker than *minuscula minuscula*, as originally stated by Grote. I have a specimen from Colorado which was bred from a larva on oak sent me by Mr. E. J. Oslar, but which spun in transit. I have another specimen from Las Vegas, New Mexico, 1898, which I think came from Prof. C. P. Gillette, although it is not labelled, and a third, in which the ground color is lighter, thus approaching the typical form, Winnipeg, Manitoba, July 19, 1897 (A. W. Hanham).

***Roeselia minor* Dyar.**

Still larger than *minuscula fuscula*, the wings smooth gray, the markings finely written, the outer line well excurved. It is possible to consider this as a race of *minuscula*, though I am inclined to regard it as specifically distinct.

***Roeselia bicrenuscula*, new species.**

Fore wing shining rather dark gray; three raised brown spots in the cell; lines two, slender, blackish both crenulate, the inner regularly arcuate, the outer shortly and bluntly excurved between veins 2 and 4; subterminal line dark, shaded, wavy, followed by whitish. Hind wing pale brown, paler at base. Expanse, 28 mm.

Type, female, No. 25809, U. S. Nat. Mus.; "Arizona" without definite locality (Schaus collection).

Near *conspicua* Dyar, but the markings very distinctly written, whereas that is faintly and obscurely marked.

***Roeselia conspicua* Dyar.**

I consider this a distinct species, and do not follow Sir George Hampson and others who refer it as a synonym to *minuscula fuscula*.

***Roeselia varia* Barnes & Lindsey.**

I have a cotype, by the kindness of the authors of the species, from the Chiricahua Mountains, Arizona. A number of specimens were sent me some years ago by Mr. Osler from the Huachuca Mountains, August 21–25, 1903 (E. J. Osler). It resembles *minor* most nearly, the outer line being more sharply denticulate and the ground color darker.

***Roeselia extusata*, new species.**

Fore wing gray, dark, without any purplish tint; a square blackish shade in outer half of cell, reaching costa, emarginate without and showing a white discal mark. Lines dentate, the inner excurved, the outer strongly excurved around cell; subterminal line crenulate and slightly waved, pale, submacular, edged darker within. Fringe checkered. Hind wing dark brown. Expanse, 25 mm.

Type, female, No. 25810, U. S. Nat. Mus.; Ramsey County, Arizona, 5800 feet, August 1, 1910 (K. R. Coolidge).

***Roeselia dentata* Dyar.**

Besides the type I possess a male from the Barnes collection, Huachuca Mountains, Arizona, August 1–7, and a female from the Schaus collection, "Arizona," without definite locality.

Family NOCTUIDAE

Subfamily HADENINAE

***Trichestra bicatenata*, new species.**

Fore wing purplish gray, the median space contrastingly darker; costa narrowly light, with several black flecks; subbasal line black, crenulate, crossed by a basal dash; a red shade on

submedian. Inner line curved, outer excurved over cell, both faintly doubled, dark, smooth; claviform black, solid, thick; orbicular a large ringlet filled by ground-color, obscure; reniform distinct, white-edged, dark filled; subterminal line whitish, faintly yellowish, powdery, submacular, distinct in the light purplish terminal field; terminal line a shade darker than the ground, broad. Hind wing pale in the disk, veins and terminal area, purplish gray. Expanse, 28 mm.

Type, female, No. 25811, U. S. Nat. Mus.; Mexico City, Mexico, October, 1921 (R. Müller).

***Eriopyga perfragilis*, new species.**

Fore wing light ashen gray, the lines whitish; orbicular a large ringlet, reniform full and subquadrate, both pale outlined; outer line oblique, only a little irregular, single; subterminal line slightly irregular, distinct; fringe pale. Hind wing whitish, the veins and terminal edge darker. Expanse, 25 mm.

Type, male, No. 25812, U. S. Nat. Mus.; Zacualpan, Mexico, April, 1921 (R. Müller).

***Hydroeciodes cetebu*, new species.**

Fore wing orange-ocherous, powdered with dark scales; inner line thrice arcuate, faintly doubled; median shade-line bent on median vein; outer line crenulate, with lines on the veins to margin; subterminal line a little wavy; a black dot for claviform; orbicular and reniform narrowly dark outlined, the latter with two white specks in the lower edge. The lines are relatively inconspicuous, and tend to outline the paler contrasting areas, which are the reniform, orbicular, and an outer rounded macular band, formed of the subterminal space. Hind wing dark bronzy brown, the apex red-brown. Expanse, 26 mm.

Type, female, No. 25813, U. S. Nat. Mus.; Zacualpan, Mexico, April, 1921 (R. Müller).

***Hydroeciodes tintebela*, new species.**

Fore wing orange-ocher, marked with red-brown, the terminal space being solidly of this color, the cell largely filled with it, and the distinct angled median shade-line also so colored. Lines

red-brown; inner and subbasal of broad arcs, narrow; clavi-form similar to a loop of the inner line; costa mottled, and with little pale dashes outwardly; orbicular outlined; reniform cut by lines on the veins, the lower of these marginal spots whitish tinged; outer line crenulate on the veins, excurved over cell. Hind wing dull red, veins darker, fringe somewhat pale. Expanse, 27 mm.

Types, two males, No. 25814, U. S. Nat. Mus.; Zacualpan, Mexico, December, 1921 (R. Müller).

Subfamily ACRONYCTINAE

Oligia iridis, new species.

Close to *bridghami* Grote & Robinson, of the same size, darker, the median space clear red-purple, more uniform and brighter than in *bridghami*. Hind wings dark fuscous, lighter at base, with a faint outer dark line, relieved by a narrow pale shade beyond. Expanse, 20 22 mm.

Types, male and female, U. S. Nat. Mus.; without locality (Coll. J. B. Smith), labelled "*Had. Bridghami* G. & R." in Smith's handwriting. In his catalogue (Bull. 44, U. S. Nat. Mus., 141, 1893), the late John B. Smith gives the habitat of *bridghami* as "Eastern States, Massachusetts in July," and as these specimens were doubtless before him at the time, their origin must be included in this statement.

Bagisara gustata, new species.

Near *buxea* Grote, yellower, the fore wing distinctly yellow, with the lines faint, but the terminal burnt-brown shade very distinct. Expanse, 28 30 mm.

Types, male and female, U. S. Nat. Mus.; Chiricahua Mountains, and Huachuca Mountains, Arizona (gift of Dr. William Barnes).

Oslaria haematosticta, new species.

Frontal process large, with raised edges, the lower rim arcuate, the upper straight across, produced into a short plate with a slight point in the middle. Fore wing brownish yellow.

irrorate with dark red at base and along costa; inner line diffused, dark red, obsolete across cell; outer line narrow, mustard-brown, faint, excurved over cell; reniform elliptical, mustard-brown, faint. Hind wing rather dark fuscous with pale fringe. Expanse, 19 mm.

Type, female, U. S. Nat. Mus.; Mesilla Park, New Mexico, at light, July 8, 1897 (T. D. A. Cockerell).

Neumogenia bellamusa, new subspecies.

Fore wing metallic green-bronze; a wide straight costal stripe of white, shading to gray on outer half; a white streak on median vein, widening at end of cell, projected a little on veins 3 and 5, following vein 4 to termen, fringe gray, with white interline. Hind wing lightly shaded with gray-brown. Expanse, male, 34 mm.; female, 32 mm.

Types, male and female, U. S. Nat. Mus.; Zacualpan, Mexico, July, 1913 (R. Müller); Iguala, Guerrero, Mexico, June, 1906 (W. Schaus).

This differs from *albavena* Ottolengui, of which it may be considered a subspecies, in the greater extent of the white markings. *Smithi* Druce, from Mexico, differs in a similar way from its Arizona subspecies, *sagittalba* Ottolengui. On the other hand, *coromides* Druce from Mexico has less of white marking than its Arizona form, *pendula* Ottolengui. *N. poetica* Grote is specifically distinct from the three, and no Mexican representative of it is at present known.

Thurberiphaga diffusa Barnes.

Alaria diffusa Barnes, Can. Ent., xxxvi, 238, 1904.

?*Nocloa diffusa* Barnes & McDunnough, Cont. N. H. Lep. N. A., i, No. 4, Pl. xii, fig. 1, Pl. xxvi, fig. 3, 1912.

Thurberiphaga catilina Dyar, Ins. Ins. Mens., vii, 188, 1920.

The figures given by Barnes & McDunnough seem undoubtedly to represent the insect described by me.

Subfamily ERASTRINIÆ

Dasyblemma, new genus.

· Falls with *Catoblemma* Hampson (Cat. Lep. Phal, Brit. Mus.,

x, 36, 1910), but the palpi have the third joint long, slender, acicular.

Dasyblemma straminea, new species.

Fore wing long, creamy, tinged with straw-color; a black line along costal edge to beyond middle; inner line dotted, bent at right angles on median fold, discal mark a clouded oval; outer line slender, black, strongly excurved over cell, a little dotted on the veins; subterminal line distinct only opposite cell, dotted; terminal dots diffused. Hind wing pale, smoky-shaded outwardly; fringe pale. Expanse, 19 mm.

Type, male, No. 25815, U. S. Nat. Mus.; Palm Springs, California, October 17, 1920 (K. R. Coolidge).

Chamyris obscura, new species.

Similar to *cerintha* Treitschke, smaller, the median band of fore wing darker, nearly as dark as the terminal markings. Hind wing fuscous, paler at the base, with a dark discal dot. This is larger than *sirius* Barnes & McDunnough, more of the *cerintha* type, though obviously distinct. Expanse, 26 mm.

Type, female, U. S. Nat. Mus.; Thomasville, Georgia (Mrs. A. P. Taylor).

Family NOTODONTIDAE

Lirimiris truncata Herrich-Schaeffer.

This species must be added to the North American list on the strength of a specimen before me from Arizona. The larva was collected in the Santa Rita Mountains, Arizona, on *Thurberia thespoides* by Mr. W. D. Pierce, and the adult was bred by Mr. B. R. Coad, emerging September 14, 1913. The tough cocoon of brown silk accompanies the specimen, evidently spun in a crevice of the breeding-cage.

Heterocampa varia Walker.

Heterocampa varia Walker, Cat. Brit. Mus., v, 1023, 1855.

Disphragis georgiana Dyar, Ins. Ins. Mens., ix, 139, 1921.

Disphragis baryspus Dyar, Ins. Ins. Mens., ix, 141, 1921.

Mr. F. H. Benjamin has shown me a specimen compared with Walker's type by Dr. J. McDunnough, which matches

both *georgiana* and *baryspus*. The former are bred specimens, somewhat dwarfed, the latter a fully developed captured specimen. I do not now think there is any other difference between them, and both will fall to *varia* Walker, which is now positively identified.

Family GEOMETRIDAE

Subfamily ACIDALIINAE

Euacidalia balistraria moricaria, new subspecies.

Very much darker than the typical form, dark brownish gray, the lines as usual.

Types, male and female, No. 25824, U. S. Nat. Mus.; Palm Springs, California, March 5, 1922 (K. R. Coolidge).

Subfamily LARENTIINAE

Stamnodes mendocinonensis, new species.

Fore wing light gray, darker at apex; inner line forms a white oval mark on costa, enclosing a spot of the ground-color; outer line broad, whitish, crossing the wing, bent at vein 4 and thence parallel to outer margin. Fringe checkered with dark at the ends of the veins. Hind wing immaculate. Below, fore wing with a pronounced dark subapical patch, the markings else repeated. Hind wing mottled with dark brown; median line white, strongly excurved on its central third, followed by patches of dark brown below costa and above tornus. Expanse, 25 mm.

Types, two females, No. 25819, U. S. Nat. Mus.; Mendocino, California, November 3, 1920 (H. C. Nichols).

Stamnodes catastrophata, new species.

Fore wing gray, tinged with yellowish centrally, the apex tinged with red. Two dark marks on costa, not exceeding subcostal vein; outer line broad, blackish, bent at vein 4 and obsolete below vein 2. Hind wing immaculate. Below gray, strigose-powdered with dark on apex of fore wing and all of hind wing; latter with a median dark band, bent at right angle on vein 4. Expanse, 30 mm.

Type, female, No. 25820, U. S. Nat. Mus.; San Diego, California (gift of B. Preston Clark).

Apparently allied to *cassinoi* Swett and *pearsalli* Swett, but there is no dark mark on the costa beyond the outer line.

Stamnodes gratificata, new species.

Fore wing light gray, shading to yellowish over the disk, the apex broadly dark red. On the costa centrally a shaded dark brown reaches vein 4 and loops back to costa again, enclosing a patch of the ground color. Hind wing immaculate. Beneath apex of fore wing and all of hind wing dark-powdery on a purplish ground; hind wing with a single dark band, sharply angled at veins 4-5, slightly denticulate on the veins. Expanse, 29-30 mm.

Types, two males, No. 25821, U. S. Nat. Mus.; Claremont, California (C. W. Metz); San Diego, California, December 9, 1919 (K. R. Coolidge).

Lithostega angelicata, new species.

Fore wing soft light gray; inner line broken in the cell, wavy, dark; outer line broad, except at terminations, brownish, streaked with dark on the veins. Outer margin broadly dusky, with duplicating inner line, crossed by a broad, wavy, pale subterminal line. Hind wing smoky tinged, darker outwardly. Expanse, 26 mm.

Type, male, No. 25822, U. S. Nat. Mus.; "California" (Coquillett collection), No. 141.

Acasis februalis, new species.

Palpi very short, just exceeding the front. In the male, vein 2 of hind wings goes straight to the inner margin at middle; in the female this vein reaches the anal angle, touching vein 1 there.

Light gray, appearing dotted and strigose. Subbasal line oblique; inner double; several faint lines in median space, the central one most distinct; outer line double; veins longitudinally dotted and double dots on termen. Hind wing pale, with

a double outer line close to the margin, which is itself gray. Expanse, 18-20 mm.

Types, a male and two females, No. 25823, U. S. Nat. Mus.; San Diego, California, February 10, February 14, March 7, 1920 (K. R. Coolidge).

***Nasusina irremorata*, new species.**

Fore wing pale gray, the lines blotched with blackish. A basal blotch, another on costa, narrowed and extending to median vein in the male, or across the wing in the female; median line wavy, broadly double, more or less filled in with dark, enclosing the dark discal spot; outer line blotched on costa only, narrow below; subterminal line more or less blotched to the margin. Hind wing with discal dot, outer and submarginal lines, the submarginal more or less blotched inward; submarginal more or less blotched to the margin. Expanse, 18-20 mm.

Types, a male and two females, No. 25827, U. S. Nat. Mus.; male, Palm Springs, California, March 9, 1922 (K. R. Coolidge); females, Argus Mountains, California, April, 1891 (A. Koebele).

Similar to *leucata* Hulst and *remorata* Grossbeck, but differing in details from both.

***Tephroclystia muriflua*, new species.**

Fore wings pointed, smooth gray, shaded with dull reddish except through cell and outwardly, the lines nearly obliterate; discal dot round, small; lines forming more or less dots on the veins, but only a double submarginal traceable; median vein and vein 2 black-lined. Hind wing gray, with four lines on the inner margin, only two of which faintly pass the middle of the wing; a minute discal dot. A black terminal line on both wings, narrowly interrupted by the veins. Expanse, 20 mm.

Types, two females, No. 25826, U. S. Nat. Mus.; San Diego, California, February 24 and March 17, 1920 (K. R. Coolidge).

Near *acutipennis* Hulst, the fore wing somewhat less pointed and more uniformly colored.

Subfamily GEOMETRINAE

Phiasne semivolata, new species.

Fore wing light gray, finely irrorate with dark; inner line bent at right angle on subcostal vein, else straight, broad on the costa, narrow below; a spot on costa beyond; discal dot oval, black; outer line double, broad, shaded, exserted at veins 4-5 and reddish there, obsolete at costa, represented by two widely separated spots, followed by pale gray; terminal area dark gray. Hind wing with a little yellowish tint, especially on the veins; discal dot minute, dark; a narrow median line; a submarginal pale line, dusky edged; inner area and termen densely strigose with dark scales. Outer margin wavy, roundedly produced at the vein-ends. Expanse, 25 mm.

Type, female, No. 25829, U. S. Nat. Mus.; San Diego, California, July 11, 1920 (K. R. Coolidge).

Phiasne pallicolor, new species.

White, lightly tinged with yellow, finely irrorated with dark. Fore wing with three dark lines, inner and outer slender, and a second outer, which is thicker; a long discal dash. Hind wing with two slender outer lines; discal dot more distinct. A dark line at base of fringe on both wings. Expanse, 21 mm.

Type, female, No. 25825, U. S. Nat. Mus.; San Diego, California, July 12, 1921 (K. R. Coolidge).

Resembles *octolineata* Hulst and *flumenata* Pearsall; vein 11 of fore wing anastomoses with 12.

Plataea dulcinia, new species.

Fore wing dentate on the margin as in *triangularia* B. & McD. Soft mouse-gray or brownish gray, the lines white; inner oblique from costa to inner margin, touching beyond the middle; outer slightly oblique in the reverse direction; discal mark linear, oblique, white, in one specimen remote from the outer line, in the other appearing as a loop of it. Hind wing entirely gray, or brownish gray with paler base. Expanse, 26-30 mm.

Types, two somewhat dissimilar females, No. 25817, U. S.

Nat. Mus.; Palm Springs, California, March 6, 1922 (K. R. Coolidge).

Stenoporpia coolidgearia, new species.

Yellowish gray, sparsely irrorate with dark. Fore wing with the inner line broad, broken into blotches, bent on subcostal vein; an obscure median line, indicated by a blotch on costa, nearly touching outer line on inner margin; discal dot a thick ringlet; outer line denticulate, excurved, broken, followed by a dentate purplish shade at veins 3-4; trace of submarginal at veins 5-6; terminal black dots between the veins. Hind wing with a dentate median line just beyond the discal ringlet, followed by a dentate purple shade from inner margin to vein 6; a dark dentate shade above tornus, and three submarginal spots between vein 4 and costa; terminal line more nearly continuous than on fore wing. Expanse, 32 mm.

Type, male, paratypes, two males, No. 25828, U. S. Nat. Mus.; Palm Springs, California, March 6, 1922 (K. R. Coolidge).

Phaeoura magnificans, new species.

Fore wing light gray, dotted with blackish, the median space shaded with purplish black; a dull orange tint at base and a large patch of this color above tornus and before apex; inner line broad, blackish, strongly excurved in cell, with a tooth on subcostal and median veins; outer line similar, dentate on the veins, somewhat produced at vein 1, strongly so at veins 3-4; a black discal mark; subterminal line faint, joining the two yellowish blotches, crossed by a blackish shade at veins 2-3 and 4-6. Hind wing darkly shaded from base to outer line; beyond light gray, irrorate and blotched with blackish; outer line similar to that on fore wing, but less sharply angled. Expanse, 65 mm.

Type, female, No. 25816, U. S. Nat. Mus.; Moscow, Idaho, June 21 (C. V. Piper).

Animomyia increscens, new species.

Larger than *morta* Dyar, less transparent, the markings more

defined. Smaller than *smithii* Pearsall, more transparent, the hind wings paler. Expanse, 19–21 mm.

Types, two males, No. 25818, U. S. Nat. Mus.; Laguna Beach, California (C. S. Baker).

Metanema simplex, new species.

Both wings slightly angled at end of vein 4. Straw-yellow, irrorate with pale brown. Fore wing with two straight lines, hind wing with one, burnt-brown with yellowish edges; a discal point on fore wing. The female has a mouse-colored tint, and the lines are heavier. Expanse, male, 27–30 mm.; female, 36 mm.

Types, three males and one female, No. 25830, U. S. Nat. Mus.; males, Real del Monte, Hidalgo, Mexico (gift of W. D. Kearfott); Mexico City, Mexico, January, 1922 (R. Müller); female, Cuernavaca, Mexico, June, 1906 (W. Schaus).

Family PYRALIDAE

Subfamily PYRAUSTINAE

Lamprosema victoriae, new species.

Markings of *canacealis* Walker, smaller, the male without the tuft of black scales at base of abdomen below; a fan of white scales in this position. Expanse, 16 mm.

Types, two males, paratypes, eight females, U. S. Nat. Mus.; Victoria, Texas, June 15 and October 2, 1912 (J. D. Mitchell); August 17, 19, October 4, 1912 (J. D. Mitchell); March 22, 1904, and April 11 (E. A. Schwarz); 1916 (J. K. Leffland).

Lamprosema victoriae sinaloanensis, new subspecies.

Larger than *victoriae victoriae*, the white markings more distinct, especially the median band on hind wing, which forms a broad silvery stripe. Expanse, 18–20 mm.

Type, male, paratypes, male and two females, U. S. Nat. Mus.; Venadio, Sinaloa, Mexico (A. Kusche, gift of B. Preston Clark).

Lamprosema subbasalis, new species.

Fore wing soft whitish gray; basal space filled in, not quite solidly with dark brown; inner line just beyond this, oblique, with a dentation in submedian space; discal dot narrowly divided, upper part upright, lower transverse, with brown spotting before and behind; outer line slightly excurved over cell, denticulate, a dentation on submedian space, slender, single; a dark shade at margin; black dots at ends of veins 3, 4, 8. Hind wing pale at base, shaded with brownish on margin; a small discal dot in the cell, and traces of pale outer curved line. Expanse, 23 mm.

Type, female, No. 25831, U. S. Nat. Mus.; San Diego, California, September 26, 1921 (K. R. Coolidge).

Subfamily NYMPHULINAE

Clupeosoma schausalis, new species.

Fore wing straw-yellow, shaded with brown on the margin, especially on the veins; subbasal line shaded, concave; inner line angled on median vein; outer line excurved over cell; discal mark a line. Hind wing whitish, with dark outer and terminal lines. Expanse, male, 17 mm.; female, 22 mm.

Types, male and female, paratypes, five females, No. 25832, U. S. Nat. Mus.; Santa Maria Volcano, Guatemala, October and November (Schaus & Barnes); also Cayuga, Guatemala, May (Schaus & Barnes).

Differs from *meticulale* Lederer in the very slight angle of the inner line, and paler color.

Clupeosoma brevicans, new species.

Fore wing rather short and broad, the outer margin only slightly excurved. Dark straw-yellow, a little bronzy; subbasal line sharply angled on submedian fold; inner line regularly curved, a little indented in the cell; discal mark reniform, the lower angle a little produced, yellowish filled; outer line regularly arcuate to vein 2, then irregular; veins dark and terminal dark line, leaving a light triangle at apex. Hind wing yellowish translucent at base; outer line curved and a little irregular;

terminal area darker; a narrow brown border, defined by a dark subterminal line. Expanse, 14–16 mm.

Types, two males and a female, No. 25833, U. S. Nat. Mus.; Santa Maria Volcano, Guatemala, April and November (Schaus & Barnes).

Clupeosoma protopennis, new species.

Straw-yellow, the margin shaded with brown; subbasal line shaded, excurved; inner line sharply angled on median vein; outer line gently curved over cell, brown, single; discal mark lunate, brown; subterminal straight across wing, rigid, shaded, brown. Hind wing with minute discal dot. Expanse, 21 mm.

Type, male, No. 25834, U. S. Nat. Mus.; Zacualpan, Mexico, April, 1922 (R. Müller).

Near *pseudopis* Dyar, but without the white spot or terminal shade.

Clupeosoma barnesalis, new species.

Wings much elongated; whitish straw-color, but heavily overlaid with dark brown. Subbasal and inner lines broad, their course not distinctly traceable among the dark shading; outer line narrow, denticulate, oblique, only slightly curved; orbicular small; reniform large, solid; subterminal line broad, adhering to terminal shade except centrally; a light rounded patch, illy defined, at submedian, base of veins 2–3 and end of cell, within outer line. Hind wing with discal dot and trace of outer line in male; dark terminal line in both sexes. Expanse, male, 21–23 mm.; female, 33 mm.

Types, two males and one female, No. 25835, U. S. Nat. Mus.; Santa Maria Volcano, Guatemala, October and November (Schaus & Barnes).

Resembles *lavinia* Schaus, but larger, longer-winged, the marks blurred.

Subfamily CHRYSAUGINAE

Saccopleura excissimalis, new species.

Costa deeply excised, with two white specks in the incision; outer margin deeply excised below apex, which is pointed;

uniform olive green, the costal edge and outer margin narrowly dark purple. Hind wing orange, shading to yellow at base; margin dark purple. Expanse, 28 mm.

Type, female, No. 25836, U. S. Nat. Mus.; Mirador, Mexico, February (R. Müller).

Subfamily CRAMBINAE

Crambus agricolellus, new species.

Fore wing brownish gray in ground-color; a silvery white mark from base, with a notch below centrally, ends in a point much before the outer line, shaded below with dark brown, which intensifies and extends the notch; an irregular white patch on inner margin, with brown markings around it; outer line double, silvery white filled, with a white triangle before and after on costa, angled at vein 6; a dark mark at apex, white below; a dark terminal line and terminal dashes between the veins. Hind wing shaded with brown, paler at base; fringe whitish. Expanse, 27 mm.

Types, two males, 25837, U. S. Nat. Mus.; San Diego, California, November 4, 1920 (K. R. Coolidge).

Crambus diegonellus, new species.

Fore wing light gray, irrorate with brown; a dark line, white edged within, runs from center of costa obliquely outward, forming a broad tooth, returns to submedian fold at center of wing and is shortly toothed inward; a white ray hence to the base; an outer white line, edged on both sides with brown, excurved, nearly touching outer margin, then inward to submedian fold; a double terminal dark line; two dots at veins 3-4. Hind wing light gray, inner margin and fringe whitish. Expanse, 16 mm.

Type, male, No. 25838, U. S. Nat. Mus.; San Diego, California, August 3, 1920 (K. R. Coolidge).

Subfamily PHYCITINAE

Megasis indianella, new species.

Fore wing white, sprinkled with black, tinged with yellow at

base, before inner line, along submedian fold and beyond outer line; in these luteous areas the black irrorations are slight; inner line black, broken, dentate; discal ringlet cut longitudinally; outer line incurved at discal and submedian folds; a row of black terminal dots. Hind wing white, with a soiled line at base of fringe. Expanse, 28 mm.

Type, female, No. 25840, U. S. Nat. Mus.; Indian Wells, California, May 8, 1921 (K. R. Coolidge).

***Olyca creabates*, new species.**

Costal half of fore wing white, inner half luteous; veins lined in black, vein 4 conspicuously so; inner line irrorate, forming a sharp angle on submedian fold; outer line lost, showing as a clouded area below end of cell and on inner margin; small indistinct terminal dots between the veins. Hind wing white, translucent, a little gray at apex. Expanse, 34 mm.

Type, male, No. 25841, U. S. Nat. Mus.; San Diego, California, July 27, 1921 (K. R. Coolidge).

***Euzophera postflavida*, new species.**

Fore wing dark gray at base, shaded with brown broadly in median space and to margin below; inner line pale, inwardly oblique from middle of costa, sharply angled outward at vein 1; discal mark black, rather large, on lower segment of cross-vein; outer line far out, denticulate above, sharply drawn inward at submedian fold, then out, forming a long tooth. Hind wing dark yellow at base, apical half blackish. Abdomen yellow above, the last two segments blackish. Expanse, 22 mm.

Types, two females, No. 25839, U. S. Nat. Mus.; Nouveau Chantier, French Guiana, September (E. Le Mout); St. Laurent du Maroni, French Guiana. The latter specimen has been returned to Mons. Paul Dognin, who submitted the material.

Family COSSIDAE

***Givira kunzei*, new species.**

Smaller than *theodori*, without purple shading on the outer areas of fore wing; markings otherwise similar. One specimen

has the spots consolidated into a broad dark band beyond cell, much as in Barnes & McDunnough's figure (Cont. Nat. Hist. Lep. N. A., i, (1), Plate iv, fig. 9, 1911). Expanse, 22 mm.

Types, three males, No. 25842, U. S. Nat. Mus.; Phoenix, Arizona, July 25, 1898 (R. E. Kunzé); Tempe, Arizona, July 26, 1920 (Walter & Martinez).

This may be a small form of *theodori*, which larger form I have also from Arizona localities.

Givira carla, new species.

Chalky white; fore wing with minute black dots near costa, the rest of wing with faint purplish flecks, segregating into a spot beyond cell and a brownish dot on submedian fold at middle of wing; inner margin a little reddish shaded. Hind wings with the flecks larger and more distinct on the area beyond the cell. Expanse, 27 mm.

Type, male, No. 25843, U. S. Nat. Mus.; Indian Wells, California, May 8, 1921 (K. R. Coolidge).

This is probably only a subspecies of *durangona* Schaus (Journ. N. Y. Ent. Soc., ix, 74, 1901), the markings being lighter and less extended in the present form, though the same in character.

Family DALCERIDAE

Zadalcera muncia, new species.

Like *fumata* Schaus, but vein 6 crowded toward lower angle of cell, making the black discal bar long and narrow; median gray shade running out to the margin and broadly expanded. Expanse, 31 mm.

Type, male, No. 25424, U. S. Nat. Mus.; San Bernardino, Paraguay (K. Fiebrig).

Zadalcera dierrhycoa, new species.

Like *arhathdota* Dyar, smaller, vein 6 arising well above the end of the discal vein instead of practically continuous with it. Expanse, 35 mm.

Type, female, No. 25304, U. S. Nat. Mus.; as the preceding.

SPECIES OF *DOLERUS* FROM OREGON¹*(Hymenoptera, Tenthredinidæ)*

BY ALEX. D. MacGILLIVRAY

The following new species form a part of a collection of saw-flies received from Professor A. L. Lovett of the Oregon Agricultural College, Corvallis, Oregon, several years ago. The western species of *Dolerus* differ from the eastern in having a wider range of modification of the scutellar appendage. All the black species of the east have this appendage smooth and polished while there are western black species with it smooth, longitudinally striate, and transversely striate.

Dolerus nervosus, new species.

Female. Body black with the collar broadly, the tegulae, a mesal spot on the median lobe of the mesonotum, the cephalic tip of each lateral lobe, tibiae of prothoracic and mesothoracic legs, the underside of the metathoracic tibiae more or less, and abdominal segments one to six, rufous; antennae with the third segment distinctly longer than the fourth, the fourth and fifth subequal; head densely punctate, finer and more dense on the face; concave furrow indicated along caudal margin of each compound eye, not extending to lateral ocelli; vertical furrows elongate, punctiform; mesal portion of median lobes more closely punctate than the lateral, not with large punctures; mesopleura coarsely densely punctate; saw-guides with dorsal margin straight, ventral slightly convex, distal end concave, pointed above; wings hyaline, costa and stigma black, veins lighter in color. Length, 8 mm.

Habitat: Colorado Lake, Oregon (E. V. Storm).

This species runs to *tibialis*. Its larger size and different coloration will distinguish it.

Dolerus nidulus, new species.

Female. Body and all its appendages black; head and thorax

¹ Contributions from the Entomological Laboratories of the University of Illinois. No. 78.

hoary with long white setae; antennae with third segment longer than the fourth, fourth slightly longer than fifth; head with front and facial orbits densely punctate, a broad concave depression, more or less oval in outline, extending from the vertical orbits toward the compound eyes, postocellar area polished with sparse large punctures; vertical furrows broad deep wedge-shaped depressions; median lobe of mesonotum with lateral portion more densely and closely punctate than the mesal portion; cephalic end of each lateral lobe polished and impunctate, appendage of the scutellum transversely striate, striations weak; mesopleura densely punctate; saw-guides with the dorsal margin straight and oblique, ventral margin convex, distal half converging rapidly to dorsal margin, forming a blunt distal end, surfaces densely setiferous with long stiff setae; wings slightly smoky, stigma, costa, and veins black. Length, 10 mm.

Habitat: Corvallis, Oregon (A. M. Scott).

This species falls near *collaris* and *unicolor*, from which it can be separated by difference in color.

Dolerus nativus, new species.

Male. Body black with abdominal segments one to six and the greater part of the seventh, rufous; antennae with the third segment longer than the fourth, the fourth slightly longer than the fifth; head and thorax hoary with long white setae; front and facial orbits densely punctate, postocellar area coarsely punctate, elevated area with a few punctures on each side of vertical furrows; rounded furrow along caudal margin of compound eyes; vertical furrows large, long broad deep depressions; each lateral portion of median lobe of mesonotum densely punctate, mesal portion almost impunctate; cephalic end of each lateral lobe impunctate; scutellar appendage striate only on lateral portions; mesopleura densely punctate; wings black, smoky, veins, and costa and stigma black. Length, 8 mm.

Habitat: Entermille, Oregon (Baker).

This species is related to *bicolor* and *borealis*

Dolerus nimbosus, new species.

Female. Body with the exception of a fine white line on the caudal margin of the abdominal segments, black; head and thorax hoary with long white setae; antennae with third segment slightly longer than fourth, fourth longer than fifth; front and the facial orbits finely densely punctate; postocellar area finely densely punctate, the punctures finer and closer than on the vertical orbits; transverse furrow from the vertical furrows behind the compound eyes, broad, not deep, no impunctate area near the vertical furrows; vertical furrows, if present, punctiform, very shallow; the median lobe of the mesonotum more closely punctate than the lateral lobes, both coarsely punctate, not with larger punctures along each lateral margin; the mesoscutellum closely punctate; the mesopleura more coarsely punctate than the mesonotum; the saw-guides with the dorsal and ventral margins converging, the ventral somewhat convex, bluntly pointed at apex; wings slightly smoky with the veins, costa, and stigma black. Length, 9 mm.

Male. The male is similar to the female in coloration and structure. Length, 8.5 mm.

Habitat: Eugene, Oregon (received from A. L. Lovett).

This species runs to *abdominalis* but is very different in appearance.

Dolerus nectareus, new species.

Male. Body black with abdominal segments one to five, rufous; antennae with the third segment longer than the fourth, the fourth and fifth subequal; front, facial orbits, and postocellar area finely densely punctate; vertical furrows broad indefinite depressions; flat area adjacent to each vertical furrow, surface with a few large punctures and with numerous fine punctures interspersed; each lateral portion of the median lobe of the mesonotum more densely punctate than the punctate mesal portion; cephalic end of each lateral lobe smooth, polished, general surface sparsely punctate, punctures shallow; scutellar appendage coarsely striate with distinct corrugations; wings smoky with veins, costa, and stigma black. Length, 9 mm.

Habitat: Entermille, Oregon (Baker).

This species is near *agcistus* and *neoagcistus*.

***Dolerus nominatus*, new species.**

Female. Body black with each lateral half of the median lobe of the mesonotum, the lateral lobes, and a large spot on the upper part of the mesopleura, rufous; antennae with the third segment slightly longer than fifth; head covered with white setae; not appearing hoary; front and facial orbits densely closely punctate, postocellar area not so densely punctate, flat area on each side of postocellar area with polished surface and a few large punctures; head depressed around ocelli and postocellar area, no furrow at caudal margin of compound eyes; vertical furrows practically obsolete; lateral rufous portion of median lobe of mesonotum densely punctate, mesal portion black polished, almost impunctate; scuteller appendage with shallow striations; saw-guides with dorsal margin straight, oblique, ventral margin straight, distal portion oblique, bluntly rounded; wings black with the veins, costa, and stigma, black. Length, 11 mm.

Habitat: Oregon (received from A. L. Lovett).

The unusual coloration of this species is distinctive.

***Dolerus nocuus*, new species.**

Female. Body wholly black, the flagellum of the antennae, the distal portions of the legs, and the abdomen beyond the basal plates, except the saw-guides, more or less suffused with reddish, specimen seems immature in coloration, suffusion may be characteristic of species; antennae with third segment longer than fourth, fourth longer than fifth; head sparsely coarsely punctured throughout, vertical furrows linear; median lobe of mesonotum uniformly punctured, lateral lobes without an impunctate area; scutellar appendage not striate; mesopleura sparsely coarsely punctate; saw-guides polished, margins and tips setiferous, dorsal and ventral margins straight, distal end oblique, pointed above; wings hyaline, with veins, stigma, and costa black. Length, 10 mm.

Habitat: Mary's Peak, Oregon (L. G. Geutner).

This species is related to *nyctelius*.

***Dolerus nauticus*, new species.**

Female. Body wholly black, including legs and antennae; antennae with third segment longer than fourth, fourth and fifth subequal; head with front and facial orbits closely punctate, the postocellar area sparsely punctate, the vertical orbits polished, extending to vertical furrows; furrow between vertex and occiput faint, no carina; vertical furrows broad and deep; head and thorax hoary with an abundance of long white setae; median lobes of mesonotum sparsely punctate, sometimes with one or two large punctures on lateral portions; lateral lobes punctate, without an impunctate area; saw-guides with dorsal and ventral margins straight, slightly converging, distal end bluntly obliquely rounded; wings hyaline with costa, stigma, and veins black. Length, 8 mm.

Habitat: Corvallis, Oregon (W. J. Kocken).

This species is related to *neocollaris*.

***Dolerus necessarius*, new species.**

Female. Body wholly black; antennae with third segment longer than fourth; fourth longer than fifth; front and facial orbits densely coarsely punctate, postocellar area densely and more finely punctate, vertical orbits coarsely punctate; vertical furrows short, pit-like; median lobe of mesonotum punctured, lateral portions more densely than mesal; lateral lobes punctured, without an impunctate area; scutellar appendage longitudinally striate; mesopleura densely coarsely punctate; mesosternum hoary with long stiff white setae; saw-guides with dorsal margin straight, ventral margin convex, distal end long oblique, convex, sharply pointed above, setiferous; wings hyaline with stigma, costa, and veins black. Length, 10 mm.

Habitat: Kings Valley, Oregon (A. L. Lovett).

This species is related to *plesius*.

THE MOSQUITOES OF THE YELLOWSTONE NATIONAL PARK

(*Diptera, Culicidae*)

By HARRISON G. DYAR

The Yellowstone National Park occupies a very large area in northern Wyoming, lapping over for a short distance into Montana. The Park was established to conserve the remarkable hot-water formations and geysers; but these have no interest in the present connection, as the hot water is not a factor in breeding conditions. The area of the Park embraces the crests of the Rockies, of which the higher altitudes are well forested. The lower slopes, however, are bare, and continuous with the arid country below. The Canadian fauna follows the forested region of the higher altitudes. The fauna of the arid region runs up the slopes, and there is often an interesting succession of species, as will be noted in detail under the specific headings following.

THE STATIONS

Collections were made at six stations, resulting in 3,143 specimens of mosquitoes. These stations were as follows:

Livingston, Montana. On the Yellowstone River at the point where the stream emerges from the hills into the plain. The altitude is 1,150 feet above sea. The river is running rapidly, and has formed small gravelly plains or deltas, which are densely grown up with cottonwoods and willows. In the cover of this vegetation, at time of flood, many small pools and channels of water appear by seepage from the main stream. The country surrounding is hilly, bare, except for a desert vegetation. Collections were made in the timber and also in the open; but most of the specimens came to hand in the timber. *Aedes vexans* Meig. predominated, with *A. mutatus* Dyar a close second; *A. idahoensis* Theob. was third with *A. hirsuteron* fourth, though far in the rear. These captures indicate normal flood conditions in the valley as would exist at lower altitudes, except for the presence of *A. mutatus*, a species peculiar to

the flood-pools of the swift streams of the Rocky Mountain watershed. The fauna here is essentially of the arid valley type. The small size of the flood-pools has evidently excluded *aldrichi* and favored the presence of *hirsuteron*. The details of the species taken are shown in the accompanying table, in percentages (see page 46).

Mammoth Hot Springs, Wyoming. This station is situated some 60 miles farther up the Yellowstone, but on a small tributary stream, the Gardiner River. The altitude is 6,387 feet. The station is on a bench high above the river, in open sagebrush covered hillsides. The slopes rise abruptly from the river, which is in the bottom of a deep gorge, and extend far above the station, undulating and irregular. In the hollows between are occasionally small temporary pools or ponds.

The breeding of mosquitoes was practically confined to the flood-pools in the river-bed of the Gardiner River. The pools on the hillsides seem to produce practically nothing in the way of mosquitoes, except *Culiseta* and *Culex*, which are wholly negligible economically in this region. *A. mutatus* Dyar predominated, and *A. impiger* Walk. and *A. communis* DeGeer second and third, respectively. The fauna of the plains is now definitely left behind. The fauna of the stream itself predominates, with a strong admixture of the Canadian fauna, although timber-line is not yet in sight. *A. idahoensis* of the arid plains persists in small proportion. Reference is made to the detailed table.

Camp Roosevelt, Wyoming. This station is on the Yellowstone River, about halfway between Mammoth and the Canyon, at an altitude of about 7,000 feet. Heavy forest covers the upper hills, but the lower hills bordering the river are bare. The river here flows through a steep gorge without deltas in the vicinity, although the captures indicate that there are flood-pools at no great distance. The camp itself is in the edge of the forest, overlooking the open hills which obscure a view of the river itself. A small stream, called Lost Creek, comes out of the high forest and soaks into a marshy plain, now

open, although perhaps once wooded, to emerge below and empty into the Yellowstone a mile or more downstream.

Of the mosquitoes, *A. idahoensis* Theob. predominated; but this was largely due to the results of an automobile ride across the river into open country some 4 miles up the Lamar River, a tributary of the Yellowstone. Mr. W. C. Troutman of the Tower Falls Forest-Ranger Station had informed us that mosquitoes were plentiful in this region, and undertook to act as guide. His statements were verified in the existence of a considerable number of this species resting in the rabbit-brush and sage of the open hillsides. Mosquitoes at the camp were unhappily scarce at the time of visit, to one intent on collecting.

Second in abundance was *A. pullatus* Coq., and *A. fitchii* F. & Y. was third. The Canadian fauna is thus definitely established with the proximity of the forest, although its normal proportions are distorted. The paucity of captures had something to do with this. The camp, in favorable seasons, is well situated to enjoy the mosquitoes of both mountains and plain, or perhaps we should say to suffer from them.

Old Faithful, Upper Geyser Basin. This remarkable geyser gives its name to the station. Altitude, 7,394 feet, on a small stream, the Firehole River, flowing into the Madison River, with outlet to the west. The hills are forested, although the valley is narrowly open, largely due to the presence of the hot water formations, so destructive to vegetation. Two large marshy ponds are fed by a small rill that drains into the Firehole River. This latter stream is swift and turbulent, with small deltas shaded by forest.

No one species of mosquito predominated strongly, the Canadian fauna appearing here well balanced. Most numerous was *A. fitchii* F. & Y., although on account of the practical impossibility of separating captured females of this from *A. excrucians* Walk., the count may have erred. However, the ring-legged species of this group certainly predominated, a fact easily attributable to the presence of the large grassy-margined ponds above mentioned. Second in abundance was *A. communis*

DeGeer, a species destined at slightly higher altitudes to strongly predominate, well justifying its name. The table gives details.

Canyon Station. This is on the Yellowstone where the river passes through a short but deep canyon, forming two wonderful falls. The hotel is on one side of the river, the camp on the other, the altitude being given as 7,710 feet. The country is very steep, hills rising to great heights all about, and the deep canyon below. Most of the country is forested, although considerable areas are open of both hill and valley; but the open country is here grassy and not with a desert vegetation, owing to the altitude. In the hollows of the hills, both under forest and in the open, but more so in the open, certain shallow depressions are early filled by snow-water. These are recognizable even late in the season by the yellow coarse nature of the grass. They are the favored breeding-places of *A. communis*, shared in lesser proportion by other species. It is not surprising, therefore, to find that this species largely predominated, forming half of the captures. *A. fitchii* F. & Y. was second and *A. cataphylla* Dyar third. The fauna thus remains essentially Canadian; but the increase in *cataphylla* gives it a more arctic complexion, reminding one of conditions in the Yukon, as befits the altitude.

I was particularly interested in the succession of the species *A. idahoensis* and *A. spenceri*. *A. idahoensis* is predominant in the dry plains of Montana, while farther to the north, in Canada, the plains becoming grassy, *spenceri* replaces it. Here *idahoensis* persisted strongly up to Camp Roosevelt, strayed as far as the Canyon, but was then replaced by *spenceri*, altitude corresponding strictly with latitude as affecting the distribution.

Yellowstone Lake, Wyoming. An enormous lake, the headwaters of the Yellowstone River, altitude 7,788 feet. This does not appear much higher than the Canyon, but is so in effect, the country being here of this level as the lowest, whereas the altitude given for the Canyon is presumably that of the hotel, perched high on a hillside. The country at the Lake is forested. The forest, however, is not moist, and breed-

ing places not abundant. Shallow early pools of the character above described occur and also small receptacles formed by the roots of overturned trees. The Canadian fauna obtained completely. *A. communis* formed over half of the captures, with *cataphylla*, *pullatus* and *pionips* Dyar close together and all together not equalling the numbers of the *communis*. The considerable number of *pionips* was due to breeding. The species had scarcely begun to fly at the time of visit. At this station, *Culiseta alaskaensis* Ludlow was taken, the most characteristically northern species of the fauna. The ring-legged *Aedes* have ceased to figure as an important ingredient of the fauna.

THE SPECIES

Aedes fitchii Felt & Young.

This is the true *fitchii*, having the male hypopygium with a strong basal spine, and not the form *mimesis* Dyar of the Montana valleys, in which this spine is weaker and the filament of the claspette longer. The specimens from Livingston, Montana, have been classified here; but no males were taken, and the form occurring there may be *mimesis*. In the forested country, *fitchii* was very common, forming about 20 per cent of the total captures. The distribution of the determinations between this species and *excrucians* is the result of pure guesswork. Every character for separation that I have tried to follow out has broken down.

Aedes mutatus Dyar.

This little ring-legged species is generally separable from *fitchii* by its smaller size and reduction of the white markings. It breeds in the little pools in the flood-deltas of swift mountain rivers. This is a racial form of the Californian *A. increpitus* Dyar. In the male hypopygium, the expansion of the filament of the claspette occurs almost exactly at the middle. The male from Drummond, Montana (Proc. U. S. Nat. Mus., lxii, 73, 1922) causes a difficulty, for the expansion is towards the base, and this influenced my original description (Ins. Ins. Mens., vii, 25, 1919); but the accumulation of material forces me to regard

this specimen as an abnormality, or at least a variation. The slide shows also an oblique chitinated piece in the basal lobe, which does not normally occur. In the Park, the species diminished at the higher stations and finally disappeared.

***Aedes excrucians* Walker.**

The species was positively determined, both by males and larvae. I have credited it with only a small occurrence, less than 4 per cent of the captures at the four upper stations; but the actual occurrence may have been larger. A portion of the *fitchii* very probably belong here.

***Aedes punctor* Kirby.**

Positively identified by males and larvae, but occurring in small proportion of captured adults. The variation of the abundant *communis* overlaps this species, so that some *punctor* may have been erroneously included therewith. In my paper on the mosquitoes of the Glacier National Park (Ins. Ins. Mens., x, 82, 1922), I stated that this species apparently does not occur. As it occurs in Wyoming, farther south along the same mountain range, the probability is that it was missed in the collecting at Glacier. This might easily happen, as the collecting there was done late in the season.

***Aedes hirsuteron* Theobald.**

Occurred only in the small flood-pools at Livingston, Montana. Specimens were bred from such pools, and the adults were not taken on the wing. The occurrence of this species instead of *aldrichi* at this station is interesting.

***Aedes idahoensis* Theobald.**

Predominant in the dry open country. *A. dorsalis* Meig. and *A. nigromaculis* Lud. occurred with it, but in much smaller proportion. At altitudes where grass replaces the desert vegetation in open country, this species ceased.

***Aedes spenceri* Theobald.**

Found rarely at high altitudes in grassy open country. This species is characteristic of the grassy prairies of Canada, North

Dakota and Minnesota. I did not find the species in the Glacier National Park, probably because collecting was not done at sufficiently high altitudes.

Aedes communis DeGeer.

As the form *lazarensis* did not occur, I have used the name *communis* instead of the *communis lazarensis* of the Glacier Park paper. In the specimens that approach nearest to *lazarensis*, the mesonotum is dark brown rather than yellow. This general darkening persists, and when the dark lines are lost, the mesonotum is uniformly dark brown, exactly as in normal *intrudens*. Many strange freaks in coloration occur, resembling hybrids with this or that. In the Glacier Park paper, I definitely referred these as hybrids, and cited two males which I took to be crosses between *lazarensis* and *intrudens*. I think now that these males are *pullatus*, with some variation and irregularity in the structures, which may perhaps frequently occur. As long as this explanation is possible, I prefer to abandon the citation of natural hybrids, for the present at least. *A. communis* was the dominant species at all the higher camps.

Aedes pionips Dyar.

Found at the higher camps. The absence of any record at the Canyon station is due to the distance of the breeding grounds there and the fact that the species was not flying at the time. This species breeds in the largest of the temporary spring pools, some of them resembling little lakes, though ultimately going dry. It was also found in the hollows formed by overturned trees. The large larvae develop slowly, and are not emerged as adults and distributed till mid-summer. At the Canyon, typical *pionips* pools were observed, but some three miles from camp, and they were not visited for collecting.

Aedes cataphylla Dyar.

Present at all the stations above 6,000 feet, more abundant at the higher ones. It apparently breeds early in the *communis* pools and similar locations. Most of the specimens taken were very much worn.

Aedes impiger Walker.

This occurs with the preceding in smaller proportion. A breeding-hole of this species was discovered at Mammoth in the bed of the Gardiner River and a series bred, which accounts for the exceptionally large proportion of *impiger* recorded for that station.

Aedes dorsalis Meigen.

This characteristic prairie form occurred at all stations in the open, diminishing as the altitude increased. My record should have shown about 2 per cent at Mammoth, but I did not happen to catch a specimen there. The collecting was small and sporadic at that station.

Aedes canadensis Theobald.

This species probably extends throughout the region, diminishing in numbers upward; but in small proportion, and it is late in emerging. It was missed, therefore, at several stations where it may occasionally be found.

Aedes pullatus Coquillett.

Occurring at all the stations, increasing in numbers upward. The larger record at Camp Roosevelt is due to a small but at the time exciting flight of this species, which occurred one evening after a strenuous day of hard search with very small results. The small record at the Canyon station, on the other hand, is due to the fact that we did not find any breeding-pools of the species there, and the record depends only on captured specimens. This species develops very late, and at all the stations was only in part on the wing.

Aedes intrudens Dyar.

I am not certain of the occurrence. No male was obtained, and the recorded specimens may all be dark forms of *communis*. However, I think that the species probably occurs.

Aedes diantaeus Howard, Dyar & Knab.

Positively identified by a male, but very rare. It was noted only at the Canyon station.

***Aedes nigromaculis* Ludlow.**

This typically prairie species was not encountered above Livingston, Montana.

***Aedes vexans* Meigen.**

Very common at Livingston, then immediately disappearing. The single specimen taken at Yellowstone Lake, the highest station, seems quite out of place. I do not think that any mistake occurred in the record, although this may be possible.

***Aedes cinereus* Meigen.**

At all stations, high and low, but never common. Its apparent absences at Mammoth and Camp Roosevelt are attributable to the accidents of collecting. The adults closely hug their breeding-places, and so are easily missed in collecting at large.

***Aedes cacothius*, new species.**

Small, compact; mesonotum coarsely scaled, dark yellowish gray with paired central lines of moderate width and posterior side lines of black, overlaid with red-brown; abdomen black above, with narrow segmental basal white bands, divided in the middle, only slightly expanding laterally; venter whitish gray scaled, the two basal segments unmarked, the posterior segments with posterior transverse black bars and a median black wedge, which runs forward from the black bar on each segment nearly or quite to the anterior border. Wing-veins black scaled, some whitish scales at base and subcostally; scales at bases of third and fourth veins forming small spots. Legs black, with many white scales intermixed; femora and tibiae below largely whitish. Claws toothed on all feet.

Types, six females, No. 25952, U. S. Nat. Mus.; Shoshone Point, 8,200 feet, Yellowstone National Park, Wyoming, June 27, 1922 (H. G. Dyar).

The specimens were taken biting near noon in bright sunlight on a road on an exposed hillside, while stopping a few minutes to enjoy the extended view to be had at this point near the crest of the divide.

It is thought that this may be the Rocky Mountain representative of *Aedes ventrovittis* Dyar of the high elevations in the Sierras. The species is of the size and general appearance of *A. cataphylla*, as that occurs in the Yellowstone Park; but the distinct stripes on the mesonotum seem to preclude a reference to that species. The wing veins are distinctly black and uniform, thus excluding both *spenceri* and *idahoensis*; *idahoensis* is further excluded by the altitude, and *spenceri* by the narrow discrete abdominal banding. The exact status of the form, however, must await further exploration. Nothing like it was taken at the lower levels.

Culiseta inornatus Williston.

This species completely replaces *incidens* Thomson of the northern Rockies, and the same condition evidently prevails in the Glacier Park. The species occurs everywhere, except at Livingston (where there was no permanent water), breeding abundantly in the extinct hot-springs, which have grown cold and dirty, with slight emission of gas. Also in marshes, especially the sulphurous and dirty ones. The adults are rare. The larger proportion noted at Mammoth was due to the breeding of a series.

Culiseta alaskaensis Ludlow.

A single specimen was taken at the Lake station while sitting out in the evening at the "bear dump" watching the antics of these animals. As the record is wholly new to the United States and Wyoming, the exact date may be given, June 26, 1922. We think that we saw another specimen at Old Faithful; but it flew away at the first motion to catch it and never returned.

Culex tarsalis Coquillett.

This species also favored the extinct hot-springs and marshes, and when one of these was found full of larvae, so that there seemed to be as many larvae as water, the impression of extreme abundance was created. But the adults never came to bite.

Good breeding places were really very scarce, so that as a whole the species is rare.

I am especially indebted to Mr. Horace M. Albright, Superintendent of the Park, who was good enough to defray my expenses and those of Mrs. Dyar through the Park in return for our recommendations as to how the mosquitoes could be controlled.

TABLE OF LOCALITIES AND SPECIES, THE NUMBERS OF THE LATTER
EXPRESSED IN PERCENTAGES

	Livingston, Montana.	Mammoth Hot Springs, Yellowstone Park, Wyoming.	Camp Roosevelt, Yellowstone Park, Wyoming.	Old Faithful, Yellowstone Park, Wyoming.	Canyon Station, Yellowstone Park, Wyoming.	Yellowstone Lake, Yellowstone Park, Wyoming.
<i>Aedes fitchii</i> F. & Y.	0.4	1.1	22.0	23.0	20.8	5.4
<i>Aedes mutatus</i> Dyar	31.8	47.0	7.3	0.9	.....	.....
<i>Aedes excrucians</i> Walk. ....	.....	.....	3.4	5.6	6.4	.....
<i>Aedes punctor</i> Kirby .....	.....	.....	8.6	0.9	1.6	0.7
<i>Aedes hirsuteron</i> Theob.	7.5	.....	.....	.....	.....	.....
<i>Aedes idahoensis</i> Theob.	18.4	0.4	26.8	.....	0.1	.....
<i>Aedes spenceri</i> Theob. ....	.....	.....	.....	0.2	0.1	0.1
<i>Aedes communis</i> DeGeer. ....	.....	12.2	4.3	21.6	49.8	51.5
<i>Aedes pionips</i> Dyar .....	.....	.....	.....	2.9	.....	12.5
<i>Aedes cataphylla</i> Dyar .....	.....	6.3	2.6	12.6	15.0	14.0
<i>Aedes impiger</i> Walk. ....	.....	20.1	2.0	.....	1.5	1.1
<i>Aedes dorsalis</i> Meig.	2.5	.....	1.3	0.5	0.1	.....
<i>Aedes canadensis</i> Theob.	0.8	.....	.....	.....	0.3	.....
<i>Aedes pullatus</i> Coq.	0.4	4.7	20.3	15.5	0.8	12.7
<i>Aedes intrudens</i> Dyar .....	.....	1.1	0.9	0.7	2.3	0.7
<i>Aedes diantaeus</i> H., D. & K. ....	.....	.....	.....	.....	0.2	.....
<i>Aedes nigromaculis</i> Ludl.	0.4	.....	.....	.....	.....	.....
<i>Aedes vexans</i> Meig.	34.4	.....	.....	.....	.....	0.1
<i>Aedes cinereus</i> Meig.	3.4	.....	.....	0.2	0.6	0.4
<i>Culiseta inornatus</i> Will. ....	.....	7.1	0.5	2.4	0.3	0.7
<i>Culiseta alaskaensis</i> Ludl. ....	.....	.....	.....	.....	.....	0.1
<i>Culex tarsalis</i> Coq. ....	.....	.....	.....	13.0	0.1	.....

NEW ENCYRTIDAE FROM AUSTRALIA.—I

(Hymenoptera)

By A. A. GIRAULT

All the following from eastern Queensland, unless otherwise stated. The types are in the Queensland Museum.

Schedius magniocus, new species.

As *uncinctipes*, but legs white save coxa 3, distal half scape dorsal edge, funicles 1 and 2, also purple; funicles 1-3 quadrate; tegulae yellow and a lunula before it; postmarginal terminating in a bristle which is shorter than bristles from submarginal.

Babinda, jungle, September.

Fulgoridicida cervantesi, new species.

Differs from *dichroma* in greater size, yellow antennae, aeneous coxae and femur 1, marginal wider, more quadrate, funicles larger, eyes larger, frons narrower, scrobicular cavity larger. Also the stronger jaw-teeth, 2 not 1, the longer. Specimens compared.

Nelson.

Mimencyrtus arboris, new species.

Aeneous, rather short, abdomen conic-ovate; tarsi, tips tibiae widely, knees reddish. Wings clear, veins dark. Scutum with dense pilosity, scutellum with sparse, shining; several rows punctures along each side vertex. Hairless line rather wide, only two lines proximad of it and a line of cilia along venation. Funicles all somewhat wider than long.

Ravenshoe, jungle, March 13, 1919.

Leptomastix geminus, new species.

Like *trifasciipennis*, but hind wings trifasciate, legs purple except tarsi; scape with a purple spot above near apex.

Kelvin Grove, Brisbane, among herbage (H. Hacker, "6-4-1913").

Paraenasomyia cinctorum, new species.

As genotype but scape's dilation a regular convexity, mod-

erately great, legs dull brown except coxa 3, femur 3 dorso-laterad on distal third, a narrow cinctus near base tibia 2 and two cincti on tibia 3, subequal to space between them; post-marginal one-third stigmal, funicle 1 only one-third longer than wide, ovipositor valves concolorous, one-fourth abdomen.

Ipswich, forest, June, 1919.

***Paraenasomyia pegasus*, new species.**

As *cinctorum* but larger, cincti of tibia 3 nearly twice larger than space between them, postmarginal subequal to the slender (and longer) stigmal, jaws 2 and 3 more widely separated and more obtuse, funicle 1 thrice longer than wide, 6 somewhat longer than wide; tibia 2 unmarked. Antennae all black. Ovipositor one-third surface; body elongate, thorax depressed.

Sydney, New South Wales, forest, October 28, 1917.

***Paraenasomyia dubia*, new species.**

As *pegasus* but less robust, legs yellow save coxa 3 (2 not yet seen); apex scape and of pedicel, clubs 2-3, funicles 5 6, white; funicles 2 3 longest, nearly twice longer than wide. Postmarginal three-fourths stigmal. Tegulae save base yellow.

Brisbane, 1914 (H. Hacker).

***Cerchysiopsis parva*, new species.**

As genotype but postmarginal somewhat shorter than the stigmal, latter shorter yet exceeding marginal which equals post-marginal. Ovipositor as long as abdomen. Funicle 1 a bit longer than wide, jaws narrower, club less wide. Aeneous, wings clear, funicle yellowish; knees, tibiae except near base widely and tarsi, white. Five lines coarse cilia proximad hairless line. Distal joint maxillary palpus with a long bristle from near apex (in other, hairy at tip). Minute.

Pentland, along the Cape River, November, 1919.

***Coccidoxenus shakespearei*, new species.**

As *tricolor* but funicles 2-4 longest, twice longer than wide, 1 a bit shorter, 6 subquadrate; abdomen yellow, at distal half margined with purple.

Two females, Nelson.

Mirsyrpophagus, new genus.

Like *Parasyrpophagus* but jaws 4-dentate, teeth obtuse, subequal; postmarginal and stigmal slightly exceeding marginal. Scrobes long, complete, a ridge between antennae. Frons wide, pine-punctate, lateral ocelli barely separated from eye, farther apart than each is from the cephalic. Scape distinctly dilated, 4-5 setae from ventral edge. Maxillary 4-, labial palpi, 3-jointed.

Mirsyrpophagus columbi, new species.

Dark green, wings clear, tibiae, knees, trochanters, tarsi, femur 2 reddish, club white. Funicle 1 longest, somewhat longer than wide, two-thirds the pedicel, 2-3 quadrate, rest wider. Scutum densely pilose, eyes, scutellum, scape and tibiae dorsad and antennae densely setose. Wings large, densely ciliate; many long setae from submarginal.

Two females, Cape York Peninsula, along the east coast.

Zooencyrtus partipilum, new species.

As genotype but fore wing hyaline, funicles 1-2 four times longer than wide, distinctly exceeding pedicel; coxae 2 and 3 green, scape yellowish brown, merely stout; scutellum finely long-lined, coppery. Tegulae yellow. Ovipositor somewhat extruded, its distal half white.

A female, Nelson.

Achrysopophagus taurus, new species.

Scape greatly, convexly dilated, flat; head only somewhat longer than wide. Golden, distal third scutum, basal third abdomen, postnotum cephalad at meson, ventral edge of scape except distal fourth, tibia 3 more or less at base, purple. Club, pedicel, black; funicles 1-3, 6, legs, infuscated; funicles 4-5, ovipositor valves (which are half surface), tarsi, tibial tips, white. Fore wing at base and from base of marginal two-thirds way to apex from apex stigmal, brown. Funicle 1 quadrate, 4 shortest, 6 longest.

Brisbane, on flowers (H. Hacker).

Coccidoxenus compactus, new species.

Wings not exceeding the body. Like *perdubius* but tibia 2 concolorous except apex, flagellum except pedicel whitish, mandible 2 distinctly narrower, abdomen not conical but short, flat, triangular, not exceeding thorax; club stouter; 4 of maxillary palpus short-ovate (in other long and slender); and postmarginal is somewhat longer than the rather long stigmal.

One female, Wynnum, forest, June 8, 1921.

Coccidoxenus aquacyaneus, new species.

As *perdubius* but tibia 2 concolorous except widely at apex (proximal two-thirds green), body narrower, thorax less evidently pilose, hind wings narrower. Postmarginal not quite half the stigmal, equal marginal, latter a bit longer than wide.

A female with tag type of *perdubius*, Cannon Hill, forest, July 7, 1921.

Parasteropaeus, new genus.

As *Neasteropaeus* but jaws rather long, with three equal, acute teeth at apex, head somewhat longer than wide. Marginal twice longer than wide, stigmal longer, postmarginal none.

Parasteropaeus lotae, new species.

Aeneus, legs 1 save coxae and the femur above and below, 2 save femur more or less centrally, apex tibia 3, tarsi, scape and apex pedicel, pallid. Fore wing embrowned to apex from about middle of submarginal. Club cylindrical, equal funicle whose small joints slightly enlarge distad, subquadrate, half of pedicel. Small, abdomen pointed.

Lota, forest, March 20, 1921.

Date of publication, February 12, 1923.

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OBSERVATIONS UPON ANOPHELES ATROPOS DYAR & KNAB

(*Diptera, Culicidae*)

By GEORGE E. BEYER

While primarily engaged in conservation work during the early spring of 1901 the writer found a species of *Anopheles* on Terrebonne Bay, Louisiana, which appeared unusual to him on account of having unspotted wings. This specimen was sent to Washington, and is in the United States National Museum, forming the basis of the record in Howard, Dyar & Knab's "Mosquitoes of North and Central America and the West Indies" of *Anopheles walkeri* Theobald from Terrebonne, Louisiana (vol. iv, p. 1035). Thus the matter rested until the spring of 1922. At this time a large number of mosquitoes were sent me for identification from Gulfport, Mississippi, and among them were badly mutilated specimens of this species. This reawakened interest, and it was deemed advisable to revisit the original locality, to determine if possible the prevalence, distribution and life cycle of this species, and especially its possible role in the transmission of malaria.

From the mouth of the Atchafalaya to Terrebonne the boat passed through a now almost uninhabited region of larger and smaller islands, lifeless, treeless, and desolate in the extreme. Even the fisher-people who formerly populated this region have deserted it and moved their families from 30 to 40 miles inland, out of reach of ever-threatening storms and tidal waves. Extremely fertile, well-settled and cultivated sections were rendered barren in a single night by the last storm, which struck

that region in September, 1909, and they have remained deserted ever since.

From information gathered, it appears that before the catastrophe of 1909, some of the settlements used to suffer quite regularly from malarial infection.

On the morning after tying up to the shore, even before daybreak, the cabin was swarming with mosquitoes. Only three species could be identified, the *Anopheles* in question, *A. crucians* and *Aedes sollicitans*. Of these, the first was by far the most numerous.

After carefully examining over one hundred perfect specimens, I became convinced that the mosquito in question cannot be *Anopheles walkeri* Theobald, but conforms in most respects with the description of *Anopheles atropos* Dyar and Knab, described from the Florida Keys. This determination has, therefore, been adopted.

In its general appearance, *Anopheles atropos* is a very dark, almost black insect, and only when viewed closely and in strong light does its coloration become distinct. Its normal resting position is different from that of other species. While resting on a vertical surface, the body in *A. crucians*, etc., is nearly at a right angle; but that of *A. atropos* is held at an angle of 45 degrees. In its attack upon man it is direct and vicious.

An immediate search was made for breeding places. We destroyed practically all the mosquitoes on the boat and explored the shore. Large and small puddles of water were carefully searched in all directions without avail. No algae were present in the pools, which had been flooded by high water. Sitting among the tall grass drew no *Anopheles*, though *Aedes sollicitans* was plentiful; but when we had returned to the boat, the *Anopheles* were there in hundreds. Only one male was seen, and the conclusion was reached that the species did not breed in the immediate vicinity. Artificial breeding experiments were therefore undertaken.

Females were taken, allowed to fill themselves with blood, and placed in a large wire cage. Specimens kept, but which

had not been fed, usually died in 24 hours. The others mostly survived the journey back to New Orleans, being supplied with moistened sugar in addition to the blood-meal. Eggs began to be deposited five days after capture, an abnormally long time, the reason for which will appear. Of these, a certain number failed to hatch, probably being infertile. The greatest number of eggs determined for one female was 199 and the least 83. The eggs resemble those of *A. quadrimaculatus*, with about 30 cells in each lateral float. The larvae hatched from 40 to 48 hours after oviposition, whereas in *A. crucians* and *quadrimaculatus*, the average time is about 72 hours. There is indication that the eggs are capable of withstanding desiccation. Some which adhered to the sides of the jar and were left above the water level by evaporation hatched when coming in contact with the water again. The following experiment seems to indicate that the eggs are naturally deposited in wet mud and not on the water, as with *crucians* and *quadrimaculatus*. A number of females were placed in a large jar, the bottom of which had been covered with a cloth moistened with salt water. In a few hours several hundred eggs had been laid on the cloth; but in a jar with a similar number of females, but which contained three inches of sea water, no eggs were deposited for four days. All the females in the two experiments had been blood-fed within a period of not more than an hour.

At first, several difficulties were encountered in raising the larvae. It was not at first suspected that the species is addicted to sea water, and this was not supplied. Again it was found that predacious insects had been introduced with the material intended for food. A second trip was therefore made to the breeding grounds and some mud, overgrown with a *Chlorococcus*-like alga and sea water were taken to the laboratory. In the meantime the above-described experiment had been tried, and the mud-breeding habit was more than suspected. To test this, a quantity of *Potamogeton pusillus* and *Cladophora fracta* was boiled for about twenty minutes. After this had stood, it became covered with a slimy scum and simply smelt to the

heavens. On microscopic examination the larger proportion of the scum was found to consist of a viscid slime and hundreds of *Vorticella*. Some of the marsh mud was now spread on the bottom of a shallow glass dish and small quantities of the boiled food were scattered about. Only enough sea water was used to barely cover the mud.

The larvae were then about 48 hours old, and did not measure 1 mm. when put in the dish. They fairly reveled in the mud, tearing away at the slimy scum, shaking off the surplus and swallowing quantities apparently out of all proportion to their size. Their growth was now fairly proportionate to their voracity. Adults were now obtained 14 days after hatching of the egg, whereas in the first attempt, under ordinary conditions, the development had taken 22 days longer.

The conclusion was reached that the larvae are almost exclusively mud denizens and mud feeders. In order for them to thrive, the volume of water must be reduced to a minimum, and only when they are replete with food will they assume what is usually the characteristic position of *Anopheles* larvae. Furthermore, they seem to be gregarious, and prefer to congregate in groups, for if separated, they will collect together again in an hour's time or less.

When first hatched the larva measures less than 1 mm. It is quite colorless and transparent, with the exception of its large head, which is dark. Gradually the color deepens, and at the end of the third day it sheds its first skin and becomes dark brown, with white transverse bands. These crossbands consist of large white spots, usually two on each segment. The broad band on the anterior part of the thorax is made up of four spots. In this conspicuous coloration the larva remains until after the second moult, which occurs approximately three days after the first. The color now changes to dark gray, while the large white spots are no longer as conspicuous, and the majority of them seem to have dissolved into minute white dots, dispersed over the entire dark median area of each segment. After the third moult the larger spots disappear completely, and only

the minute ones remain, making the larva almost mud-colored, and rather hard to distinguish from its surroundings. After the fourth moult the larva becomes mature. Length, 8 to 8.5 mm. Color, gray or yellowish gray, with a dark median stripe. The head is ocherous with dark brown markings, the pattern of which is constant, and while other variations occur, the essential features of the pattern remain. There is always a more or less broad band of deep brown just beyond the base of the antennae, and another one marking off the line between the vertex and the occiput. From this band arises a semicircular loop, which extends into the occipital region. In the center of this semicircle and attached to the posterior margin of the crossband is a larger or smaller spot of the same color. The posterior foramenal border of the skull is edged, as it is in all Anopheline larvae, with a dark brown margin, which, however, is interrupted in the middle dorsally and ventrally.

[Note by the editor. Dr. Beyer's series of colored drawings of adult and structural details of the larvae cannot be reproduced on account of the question of expense. I have therefore redrawn the more important details, more especially for comparison with the account of *A. walkeri* Theobald by Matheson and Shannon which appears herewith. Dr. Beyer's descriptions of the structures have also been omitted, as these refer particularly to the colored drawings, and are not comparative with the allied northern form. The omitted drawings include one of the genitalia, which, however, gives insufficient detail for the close comparisons requisite in this case. Dr. F. M. Root has kindly compared the slides of *atropos* and *walkeri*, and finds small, but specific differences. These will be given in a forthcoming paper by him.]

In the life of the adult insect there are several phases which remain unexplained so far. In the first place, where do they actually deposit their eggs? As already related, laboratory experiments showed them to be mud-feeders in the larval stage. On both excursions into their breeding grounds, almost every foot of land was under water to the depth of 6 inches and

more, and yet no larvae could be found, while the adults swarmed in countless numbers.

Secondly, where do the adults keep themselves during the daytime? None could be seen 6 feet away from the boat, while at the same time they were gathering on board in broad sunlight.

In regard to the distribution of the species, ascending Bayou Terrebonne, female adults came on board the boat as far as 10 miles inland, when they were suddenly replaced by *Anopheles crucians* and *quadrimaculatus*. What is the reason for this sharply drawn limit? High tide and pure salt water reaches considerably beyond this 10-mile limit at times.

Compared with other *Anopheles*, *atropos* seems to have little or no power of endurance outside the limits of its habitat. Unlike most species, it can, apparently, not endure confinement. On this account, all efforts to determine its vectorship of malaria were rendered futile, because no females could be kept alive long enough to be fed on malarial patients. Only those specimens which had been blood-fed at capture survived the return journey.

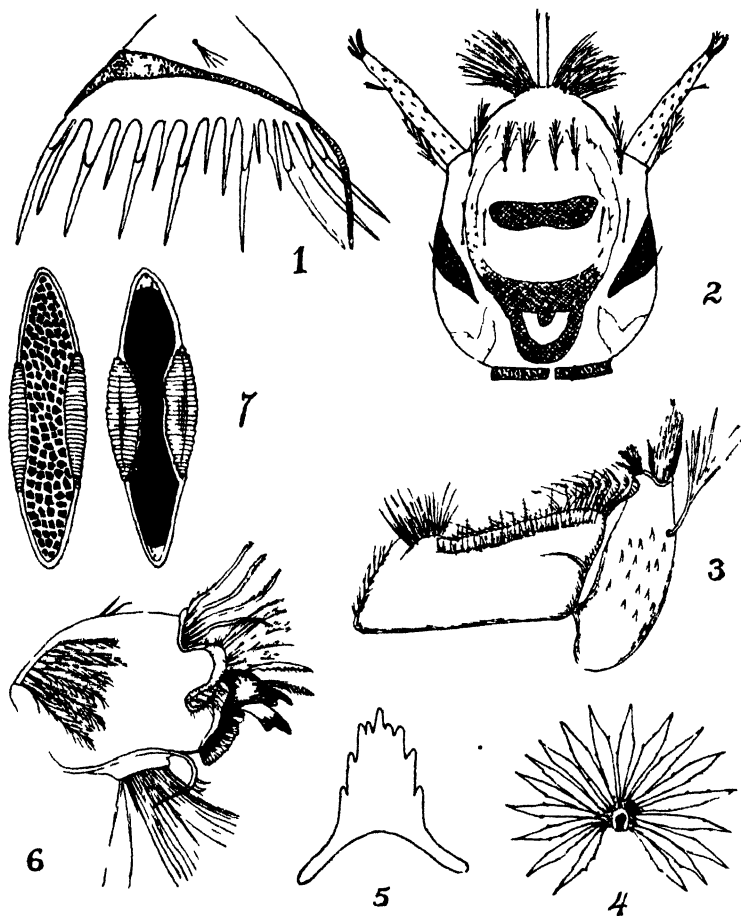
NOTE ON THE SWARMING OF *Aedes cinereoborealis* FELT & YOUNG

(*Diptera, Culicidae*)

By HARRISON G. DYAR

No observations are on record of the swarming of this species. The following is therefore presented:

At Warroad, Minnesota, on the evening of May 21, 1922, sitting in a swampy place in the edge of woods, a swarm was noticed in the air near the top of a willow bush. I was on the lookout for *Aedes riparius*, and fancied that this was a swarm of this species. An effort was made to catch some, but as I had only a short-handled net with me and the swarm was high, I failed to get any. Preparing to make a second effort, to my surprise, the swarm drifted away from the woods, still intact,



EXPLANATION OF PLATE II

Inophlex atropos Dyar & Knab, details of the larva

- Fig. 1. Lateral comb of the eighth segment
 Fig. 2. Head, dorsal view
 Fig. 3. Maxilla
 Fig. 4. Dorsal abdominal palmate hair tuft
 Fig. 5. Mental plate
 Fig. 6. Mandible
 Fig. 7. Eggs, dorsal and ventral aspects

and was lost to sight over an open meadow. I went back to sit down on my log again, but immediately noticed another swarm, probably containing 50 individuals. This was high like the other and was slowly drifting away from the woods toward the willow bush. It passed this and went out on the meadow. A third swarm followed immediately, plainly emerging from the woods, and by a violent effort some specimens were captured from it. It was evident at once that the species was not *riparius*, but *cinereoborealis*, whose strange behavior it had been my good fortune to observe. Swarm followed swarm in leisurely succession, each one following the last out over the open meadow and was lost to sight. The phenomenon lasted perhaps half an hour, until it was too dark to see, and may have continued after dark. Many hundred males must have thus passed over my head. I was unable to repeat the observation on the following or any other night. No more males appeared. Even the females presently began to be scarce, having before bitten rather freely. It is thought that these swarms of males were engaged in the act of distribution, perhaps to finish their swarming in small clusters at remote distances. I have not observed such a performance in any other species

THE ANOPHELINES OF NORTHEASTERN AMERICA

(*Diptera, Culicidae*)

By ROBERT MATHESON AND RAYMOND C SHANNON

During the past two seasons the writers have undertaken, in connection with other investigations, the rearing of Culicidae. In the course of this work, Europe's chief malaria carrier, *A. maculipennis* Meigen, has been found in two of our eastern States, New York and Michigan. The only other records for eastern North America are northern Maine and Ottawa, Canada.

In addition, the first known males and larvae of *A. walkeri* Theobald have been discovered. These were obtained in the same locality where the first examples of this species to be

found in New York were taken and recorded by the writers in 1921.

The discovery of these forms in New York increases the known Anopheline fauna for this State from three to five species. In a consideration of these new records it seems advisable to prepare a brief account covering all five of our species. As no additional species of this genus are known to occur in the States east of the Mississippi and north of the Ohio River, the North Atlantic States and Canada, the present paper may be considered as applicable for this entire region. The closely allied subgenus, *Coelodiazesis*, occurs in New Jersey and, as it may yet prove to belong to the New York State fauna, is also included.

Unlike the other Culicid genera the species of *Anopheles* are very difficult to identify in the larval stages. No satisfactory characters have yet been used to separate our most common species *A. quadrimaculatus* Say and *punctipennis* Say. Howard, Dyar and Knab (1917) place them together in their key on the basis that both possess six pairs of dorsal palmate tufts. From an examination of many specimens of *punctipennis* we became convinced that there were only five pairs of these palmate tufts in this species. This agrees with the figure given by Howard, Dyar and Knab, though in the description of the larva it is again stated that six are present. In correspondence with Dr. Dyar he informs us that he likewise believes that only five pairs are present, the figure in the monograph being correct. Headlee (1921) ignores these palmate tufts and attempts to separate *quadrimaculatus* and *punctipennis* on the basis of mandibular characters. To the writers these characters seem too difficult to be of convenient use, especially when the more obvious character to be found in the number of dorsal palmate tufts is available.

KEY TO THE LARVAE

- A. Abdomen with plumose lateral hairs on first six segments; head with small simple hairs only. (One species, *C. barberi* Coq., a tree-hole inhabiting form, New Jersey, southward) *Coelodiazesis* D. & K.

- AA. Abdomen with plumose lateral hairs on first three segments only; head with plumose hairs.....*Anopheles* Meig.
- B. Abdomen with six pairs of dorsal palmate tufts.
 - C. Mandibles with 11 terminal teeth; lateral branched hairs of mandibles (6) arranged in an outward projecting row,
quadrimaculatus Say.
 - CC. Mandibles with 9 terminal teeth; lateral branched hairs of mandibles (10) arranged in a row projecting cephalad,
walkeri Theo.
- BB. Abdomen with five pairs of dorsal palmate tufts.
 - C. First and last pairs smaller than the others....*crucians* Wied.
 - CC. All palmate tufts of nearly equal size.
 - D. Lateral plate of the eighth abdominal segment with 22-29 (8-9 long) teeth.....*maculipennis* Meigen
 - DD. Lateral plate of eighth abdominal segment with 17-22 (usually 6-7 long) teeth.....*punctipennis* Say.

KEY TO THE ADULTS

- A. Mesothorax rounded, not over twice as long as wide; wings uniformly scaled, without spots. (One species, *C. barberi* Coq., larva lives in tree holes, New Jersey, southward)....*Coelodiazesis* D. & K.
- AA. Mesothorax elongate, over twice as long as wide; wings more or less distinctly spotted.....*Anopheles* Meig.
 - B. Wings white spotted on disc.
 - C. Two white spots on anterior margin of wing; sixth vein black scaled, broadly interrupted in the middle with a white spot*punctipennis* Say.
 - CC. One white (yellowish white) spot, near apex of wing; sixth vein with three black spots.....*crucians* Wied.
 - BB. Wings without white spots on disc.
 - C. Fringe at apex of wing coppery.....*maculipennis* Meig.
 - CC Fringe at apex of wing uniformly dark colored.
 - D. Palpal segments white scaled at apices....*walkeri* Theo.
 - DD. Palpal segments uniformly dark scaled,
quadrimaculatus Say.

***Anopheles maculipennis* Meig.**

Anopheles maculipennis Meigen. Syst. Besch. Zweifl. Ins., I, 11, 1818.

Anopheles occidentalis D. & K. Proc. Biol. Soc. Wash., 19, 159, 1906.

Anopheles quadrimaculatus Herms (not Say). Jour. Parasitology, 7, 69-79, 1920.

Anopheles lewisii Ludlow. Psyche, 27, 74, 1920.

Anopheles selengensis Ludlow. Psyche, vol 27, 77, 1920.

Anopheles maculipennis Meig. has, until recently, been regarded as an old world species. Edwards (1921) after an examination of both larvae and adults considers *A. occidentalis* D. & K. as identical with the European form.

The distribution of this species is given by Howard, Dyar & Knab as "Western United States from southern California to Alaska, eastward through Canada to northern Maine." The only records for eastern North America are Ottawa, Ontario, and Weld and Norcross, Maine. During the past summer a long series of this species was reared from larvae obtained along the marshy borders of Bessy Creek, a small stream discharging into Douglas Lake, Michigan. Here the larvae were associated with *A. punctipennis*, but the latter were present in very much smaller numbers. All about Douglas Lake the dominant Anopheline was *A. maculipennis*, though *A. punctipennis* was captured or reared at intervals during the summer. Not a single specimen of *A. quadrimaculatus* was secured, although a large number of rearings were made and adults of this genus captured in the open.

During a camping trip in the Adirondacks in the latter part of August, one male and seven females were captured on the walls of one of the permanent shelters at Racquette River, close to Buttermilk Falls, in Franklin County. This species proved annoying at this place. A single female was taken later (August 31) at Raybrook in Essex County. This locality is about 40 miles distant from Buttermilk Falls.

A small collection of Anophelines from the University of Minnesota contains four specimens from Basswood Lake, Lake County, Minnesota, near the Canadian border, and two specimens from St. Anthony Park, Minneapolis. These records greatly extend the known distribution of this species for North America.

In the table given for the larvae this species keys out with *punctipennis*. We separate them on the number of spines, both long and short, of the lateral plate of the eighth abdominal segment. The number of these spines, though somewhat

variable, seems to offer the best available character for separating these species in the larval stages. Other characters, though somewhat variable, which may aid in the distinguishing of these two species are the two distinct transverse dark bands on the head of *maculipennis* and the outer humeral plumose hair which is longer and larger than the other two. In *punctipennis* the transverse bands of the head are indistinct or lacking and the outer humeral plumose hair is nearly uniform in size with the inner two.

Anopheles walkeri Theobald.

This is considered a rare North American species, the males and the larvae having been hitherto unrecorded. The first New York record was reported by the writers in 1921. Only females were taken at that time. During July, 1922, a large series of females (over 100), three males, two larvae and a pupa were taken at the same place (North Fair Haven, New York). From the pupa a male later emerged. At this time this was one of the most abundant species there, rivaling *Mansonia perturbans* in numbers and eagerness for blood. The females continued their attacks long after dusk. Again in September the place was visited and about twenty females and nine larvae were collected. A distinctive feature of this region is a slow, winding stream, Sterling Creek, which is bordered by broad stretches of cattail marshes. The larvae were found very sparingly throughout the marshes in small collections of water.

Larva, Stage IV.—Head quadrate, about as wide as long, slightly bulging at the sides, frontal portion before insertion of antennae conically produced; two long approximate setae on front margin; a pair of dendriform branching hairs on the clypeal margin dorsad of the mouth brushes; a pair of inconspicuous hair tufts just caudad of these; dorsal head hairs six, single but numerously branched, in a curved line between antennae, a plumose hair of larger size at base of antennae; four smaller plumose hairs in a line between the eyes. Antennae subcylindrical, slightly tapered, strongly spined on inner side, shorter and fewer spines on outer, a single branched hair at

basal two fifths; apically two long dentate, articulated processes, two short spines and a single branched hair. Mental plate elongate, triangular, with a central, broad, slightly indented tooth and six lateral teeth; first and second teeth equal, third and fourth pointed, fifth and sixth minute and distant. Hypopharynx (mental plate of Howard, Dyar and Knab) slightly elongate triangular with a prominent central tooth and four lateral, first lateral being small, second and third large and equal, fourth small. Mandible long, finely quadrangular, convex without; ten branched hairs in a line forming a fringe directed forward, two prominent branched ones near them; two pairs of flat appendages arising near tip, the first one simple, the second thinly feathered, the third and fourth heavily feathered; an outer row of cilia; terminal dentition of nine teeth, the first large, broad, obtuse, the second small obtuse lying in a deep depression between first and third, third longer than first, bearing on its inner side the small fourth and fifth teeth, the others small; two filaments above and three within; a square heavily dentate process below, the teeth rather long; a thick process at end of dentition, one at base, between these a row of setae, the central one the longest. Maxilla rectangular, the palpus attached by a narrow constriction; numerous long setae and short spines on inner aspect; palpus with rounded projecting base, a dendritic tuft within, four terminal digits and two flattened appendages. Thorax rounded quadrate, about as long as wide, hairs short, consisting of branched hairs, single hairs and tufts. Abdomen stout, anterior segments shorter; long feathered lateral hairs on first three segments, double on first and second, single on third; posterior hairs smaller, three to seven branches; a dorsal series of six pairs of fan-shaped tufts on second to seventh segments, the first slightly smaller. Air-tube sessile, subquadrate, roundedly angled posteriorly. Lateral plates of eighth segment broadly triangular with apex cephalad, armed on caudal margin with a series of long and short spines varying in number from 20-25 (7-9 long). Anal segment about as long as wide, with a small dorsal plate; dorsal brush a long and a

short tuft on each side; a single long lateral hair near lower margin of plate; ventral brush well developed, of long branched tufts. Anal gills moderate, longer than segment.

The larva of this species is closely allied to that of *A. quadrimaculatus* Say, having in common with that form six pairs of palmate dorsal tufts. *A. quadrimaculatus* differs in the following characters: The head is considerably longer than wide, the mandible has a terminal dentition of *eleven* teeth and *six* branched hairs in a transverse row, directed outward; the feathering of the flat appendages differs as shown in the figure.

Female.—For detailed description see Howard, Dyar and Knab (1917).

Male.—The male has previously been unknown. The writers secured four specimens, one of which was reared from the pupa.

Palpi nearly as long as proboscis, the last two joints swollen and club-shaped, with many long yellowish-brown silky hairs; vestiture black, the apex of second segment ringed with dull white. Antennae plumose; last two joints long and slender, rugose, pilose, black, the others short, pale, with narrow brown basal rings; hairs of whorls long, dense, brownish. Occiput with a median groove clothed with erect black scales intermixed with longish black hairs, a tuft of brownish yellow hairs projecting forward between the eyes; a row of black bristles along margins of eyes.

Prothoracic lobes lateral, small, with some coarse black bristles. Mesonotum narrow, elongate, brownish gray, slightly pruinose in two narrow stripes on anterior half; vestiture of short, sparse, golden brown hair-like scales, slightly denser medianly intermixed with rows of fairly well defined black hairs; bristles at roots of wings, coarse, black. Scutellum collar-like, luteous, with a row of rather dense, long black bristles. Postnotum pale brownish gray, shining, nude. Pleurae brown, pruinose; coxae luteous with black hairs.

Abdomen subcylindrical, somewhat depressed, truncate at tip, brownish-gray, slightly rugose; vestiture of numerous long dark hairs.

Wings hyaline, indistinct spots of black scales at origin of second vein, cross-veins, and at base of first forked cell. No spot at base of second forked cell. Halteres yellow.

Legs long and slender; vestiture blackish-brown, knees and apices of tibiae white. Claw formula, 2-0. 0-0-0.0.

Length: Body about 5.5 mm.; wing 5 mm.

Genitalia.—Side pieces longer than wide, somewhat conical. A well developed internal spine about one-third down the side-piece. Basal lobes distinct with two prominent spines. Inner slightly shorter than outer, stout recurved, blunt at tip. Outer tapering to a point. Both arise from strongly chitinated protuberances, that at the base of the inner spine being the larger.

Claspette distinctly bilobed. Inner lobe bears a long, sharp-pointed spine at apex. Slightly mesad of this is a second shorter, pointed spine. The inner margin of the lobe bears numerous small hairs. Ventral lobe bears at apex two large, broad, club-shaped processes which are united at their bases.

Aedoeagus narrow, elongate, strongly chitinated with four unequal rod-like leaflets at the tip.

Ninth segment apparently well developed. Ventral processes long and prominent. Anal lobe reaches well beyond aedoeagus, somewhat chitinated and bearing numerous small hairs; divided at the tip.

Distribution. In addition to the above record and those given by Dyar (Proc. U. S. Nat. Mus. 62, 106, 1922; and Trans. Roy. Can. Inst. Toronto, 13, 120, 1921) we can add a single record from Grand Rapids, Minnesota (August, 1896).

MOSQUITO NOTES

(*Diptera, Culicidae*)

By HARRISON G. DYAR

Wyeomyia, subgenus *Heliconiamyia* Dyar.

In defining this group (Ins. Ins. Mens., vii, 123, 1919), I made *galoa* the type species; but a reexamination of the material shows that the supposed male of *galoa* belongs to *chal-*

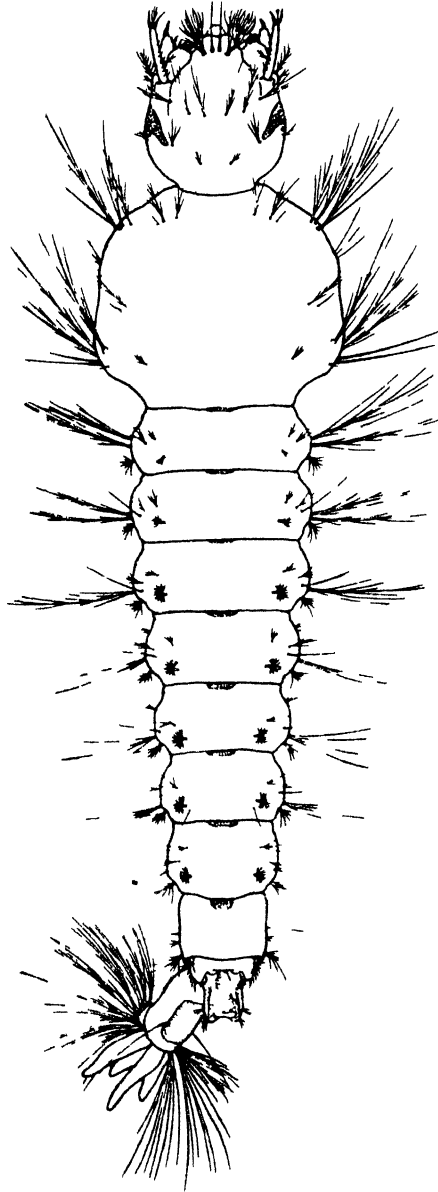
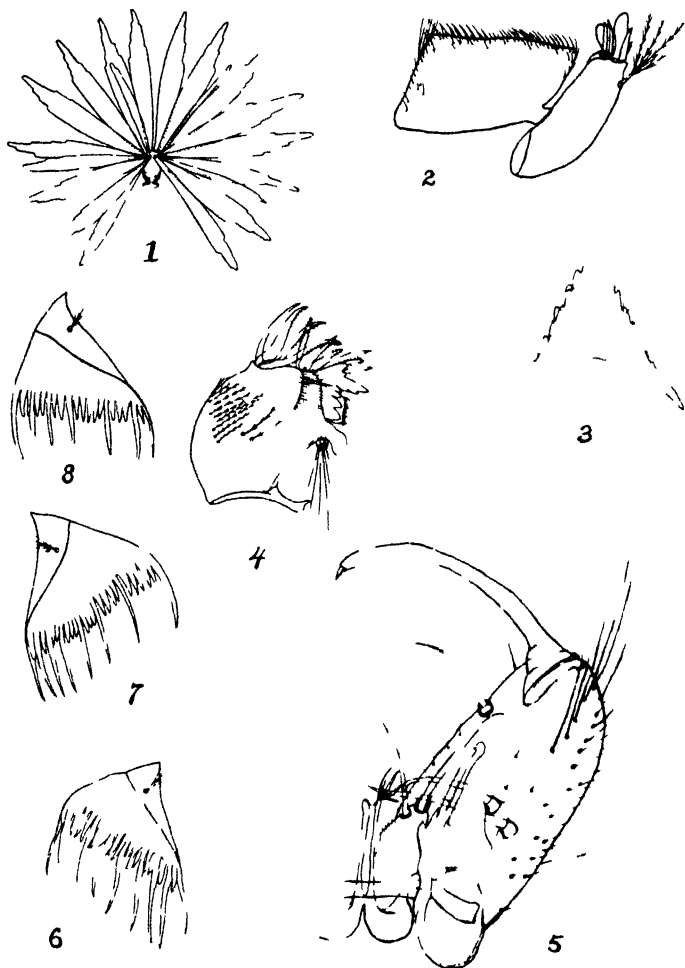


ILLUSTRATION OF PLATE III

Inphelacella theobaldi Lucifera dorsal view



EXPLANATION OF PLATE IV

In *Fig. 1* call on The bald details of larva etc

- Fig. 1 Dorsal abdominal palmate hair tuft
 Fig. 2 Maxilla
 Fig. 3 Mental plate
 Fig. 4 Mandible
 Fig. 5 Adult male hypopygium half view
 Fig. 6 Lateral comb of eighth segment of larva
 Fig. 7 The same *Anopheles maculipennis* Meig
 Fig. 8 The same *Anopheles punctipennis* Say

cocephala. The two species may not be consubgeneric; but until the true male of *galoa* is known, no change is suggested.

Wyeomyia (Heliconiamyia) galoa Dyar & Knab.

The single female type. The wing-scales are broad; prothoracic lobes dark blue; vertex with diffuse median bronzy area; tarsi dark, the last hind tarsal only whitish beneath. Bred from flower-bracts of *Heliconia*, Guatemala (Schwarz & Barber).

Wyeomyia (Heliconiamyia) chalconecephala Dyar & Knab.

The female type and three males. The wing-scales are broad; prothoracic lobes brown, of the color of the mesonotum; vertex narrowly and faintly bronzy centrally; mid tarsi with third to fifth joints continuously white below, hind tarsi whitish below, especially on the last joint, but the color is not bright; in the male, the mid and hind legs are continuously white below. Bred from flower-bracts of *Heliconia* in Guatemala, with the preceding (Schwarz & Barber).

Wyeomyia (Menolepis) culebrae, new species

Clypeus nude; metanotum with flat white scales. Prothoracic lobes and mesonotum with dark scales; abdomen dark above, white below, the colors separated on the sides in a straight line. Legs bronzy black, femora pale beneath, tarsi without markings. Wing-scales narrow. Head dark scaled behind, the eyes apparently without any white border. Prothoracic lobes with a few white scales at tip.

One female, caught by hand, Culebra, Canal Zone, Panama, 1918 (L. H. Dunn).

Wyeomyia (Dendromyia) chrysomus Dyar & Knab.

Phoniomyia chrysomus Dyar & Knab, Journ. N Y Ent. Soc., xv, 208, 1907

Wyeomyia chrysomus Howard, Dyar & Knab, Mosq. N. & Cent. Am. & W. I., ii, pl. 3, fig. 14, 1912

Wyeomyia philophone Howard, Dyar & Knab (not Dyar & Knab), Mosq. No. & Cent. Am. & W. I., ii, pl. 3, fig. 15, 1912.

Wyeomyia mataea Howard, Dyar & Knab (not Dyar & Knab), Mosq. No. & Cent. Am. & W. I. ii pl. 4 fig. 17, 1912.

Dendromyia philophone Dyar (not Dyar & Knab), Ins. Ins. Mens., vii, 126, 1919.

Dendromyia chrysomus Dyar, Ins. Ins. Mens., vii, 125, 1919.

In the monograph, it proves that the males of *W. chrysomus* served us as the supposed males of three species, *chrysomus*, *philophone* and *mataea*. I corrected the matter in regard to *mataea* (Ins. Ins. Mens., vii, 125, 1919), leaving that species without a known male, and now, unfortunately, must do the same for *philophone*. The type of *philophone* is a female, taken by Busck in Tabernilla, in the old days before the canal was built and this region flooded. The prothoracic lobes are distinctly light blue, not coppery; but in other characters—long proboscis, white spot on vertex and white on mid legs only—the species is like *chrysomus*. There is no male before me. Busck's rearings from Tabernilla (Nos. 177 and 191) are both of the coppery-lobed *chrysomus*. The type of *philophone* therefore stands alone, although I have series from Porto Bello (Jennings) and Taboga Island (Busck and Zetek) which seem to agree. It is possible that this species can no longer be found in the Canal Zone, but will have to be sought in more richly tropical and undisturbed regions. It is possible that the species is dimorphic in coloration, and that *melanopus* Dyar is the male of it. I think that this will prove to be the case; but until breeding of both sexes has been had from the same culture, it would be premature to make a definite reference to the synonymy. In any case, both *philophone* and *mataea* will fall to the earlier described *celaenocephala* D. & K., the prothoracic lobes of the type being rubbed, but otherwise agreeing perfectly. A corrected drawing of the clasper of *chrysomus* is added (Pl. V, fig. 1).

Wyeomyia (Wyeomyia) leucopisthepus Dyar & Knab.

Wyeomyia leucopisthepus Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 212, 1907.

Wyeomyia abrachys Dyar & Knab, Smith. Misc. Coll., Quart. Iss., lii, 262, 1909.

Wyeomyia chresta Dyar & Knab, Smith. Misc. Coll., Quart. Iss., lii, 263, 1909.

Wyeomyia hapla Dyar & Knab, Smith. Misc. Coll., Quart. Iss., lii, 265, 1909.

Wyeomyia labesba Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iii, 106, 1915.

Wyeomyia incana Dyar, Ins. Ins. Mens., x, 189, 1922.

These names were originally proposed for supposed differences in the white markings behind the eyes and at tips of prothoracic lobes; but the differences are partly imaginary and partly due to the condition of the specimens and to variation. Later I thought to recognize four species on the shape of the male clasper; but I am now convinced that the differences are illusory. The "core arm" of the clasper, while normally recurved and crossing the middle of the disk, may be folded back along the stem or lie wholly detached, thus giving rise to the different appearances. The specimen which I assigned to *labesba* is evidently a broken one.

Lutzia brasiliæ, new species.

Wing markings as in *bigotii* Bellardi of Mexico, as noted in the monograph (Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iii, 470, 1915). The male hypopygium, however, shows distinct characters. The mesosome (Pl. V, fig. 2) is smooth, without any teeth, being only slightly lamellate on the margin, while the single terminal tooth is large and directed laterally. In *bigotii* (Pl. V, fig. 4) there are many rounded denticles on the prehensile edge, and the terminal tooth is more pointed and smaller. The three rods on the side piece (Pl. V, fig. 3) are supplemented by several setae on the basal side, as in *bigotii* Bell. In comparison with *allostigma* H., D. & K., which intervenes geographically between the two other species, the structures are quite different, the mesosome (Pl. V, fig. 5) having a long narrow tooth with sharp denticles beyond the middle, while the rods of the side piece (Pl. V, fig. 6) are without additional setae basally.

Types, male and female. São Paulo, Brazil (Dr. A. Lutz).

Culex (Choeroporpa) egcymon, new species.

A small bronzy black mosquito; wing scales narrow, broadly

linear on the forks of second vein; femora narrowly white beneath; abdomen with whitish basal segmental lateral spots; venter whitish at the bases of the segments; palpi short in the female, exceeding the proboscis by half the length of the last joint in the male; scales on the occiput all rather narrow.

Male hypopygium. Side piece shortly conical, about as wide as long, membranously produced at tip, bearing the clasper and lobe (Pl. V, fig. 7). Clasper snout-shaped, greatly produced, with crest and seta at the bend, the spine subterminal, widened and appendiculate. Outer division of the lobe of side piece broadly conical, without limbs but forming elevated bases for the filaments, of which there are three, two with pointed tips, one with expanded tip and directed outwardly at the base of clasper; two smaller setae, near tip and base of the structure. Inner division columnar, stout and long, with two short strong filaments with bent expanded tips, one inserted basad of the other. Tenth sternites comb-shaped, with long stem and about 20 fine teeth. Mesosomal plate with the third point subapical on the stem, stout and curved; outer arm a long horn; inner arm broadly expanded, forming a long curved margin, sharply serrate with numerous teeth. Ninth tergites elongate, the tip recurved, and bearing many long dark hairs (Pl. V, fig. 8), this tip appressed to the base of the side piece, like a basal lobe, so firmly that it comes off with the side piece when that is detached in mounting (Pl. V, fig. 7). Many long dark hairs on the eighth segment, similar to those on the tips of the ninth tergites.

Types, a male and four females, bred from larvae "in slowly running spring, full of leaves and small fish. A pretty, dark, black-marked species with small pupa." Tabernilla, Canal Zone, Panama, May 2, 1907 (A. Busck).

This well-marked and peculiar species was originally determined as "*Culex elevator*" and is recorded under that name in the monograph (vol. iii, p. 417, 1915). *Elevator* was described from larvae only; but adults, apparently from the type locality, are in the collection, on the basis of which I defined the species

(Ins. Ins. Mens., vi, 106, 1918, and viii, 60, 1920). In the monograph records, the Rio Aranjuez, Costa Rica, specimens are the types of *educator*; Port Limon, the accepted types of *elevator*; Tabernilla, Canal Zone, May 2, are *egcymon*, described above; May 13 of the same entry are *iolambdis* Dyar, while the record from Caldera Island, Panama, appears to be correct, *elevator* D. & K.

Culex (Choeroporpa) conspirator Dyar & Knab.

Culex conspirator Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 207, 1906.

Culex (Choeroporpa) dysmathes Dyar & Ludlow, Ins. Ins. Mens., ix, 47, 1921

Culex (Choeroporpa) pasadaemon Dyar, Ins. Ins. Mens., ix, 100, 1921

The records for this species in the monograph are mixed (vol. iii, p. 412). It is really impossible to correctly assign these obscure species from adult coloration alone, as was attempted by us. Corrections are as follows:

Record:

Almoloya, Mexico = *conspirator*

Sonsonate, Salvador = *conspirator*

Pedro Miguel, Canal Zone = *educator*

Miraflores, Canal Zone = *educator*.

Rio Grande, Canal Zone = *educator*

Las Cascadas, Canal Zone = *conspirator*

Caldera Island, January 3 = *Culex mollis* D. & K.

Caldera Island, February 12 = *elevator*.

Tabernilla, Canal Zone = *educator*

Doctor and Mrs. Bonne referred *Culex chrysonotum* to the synonymy of *Melanoconion theobaldi* Lutz (Ins. Ins. Mens., ix, 20, 1921); but I think that this action was not carefully considered. It implies that *chrysonotum* from Panama is specifically identical with *theobaldi* of Brazil, and this was not established by the comparison of males. I am assuming that some at least of the small *Choeroporpa* have a distribution as wide as this, but the recent work of Gordon and Evans shows that the species which they identify as *chrysothorax* Newstead & Thomas has different structures, apparently of

specific value. I therefore suggest the following arrangement of names:

Culex (Melanoconion) spissipes Theobald.

Melanoconion spissipes Theobald, Mon. Culic., iii, 242, 1903.

Culex fur Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 13, 1907.

Tropical America.

Culex (Choeroporpa) theobaldi Lutz.

Melanoconion theobaldi Lutz, Imp. Med., Feb. 10, 1905.

Neomelaniconion chrysothorax Newstead & Thomas (not Peryassú), Ann. Trop. Med. & Par., iv, 145, 1910.

Culex (Neomelaniconion) chrysothorax Gordon & Evans, Ann. Trop. Med. & Par., xvi, 322, 1922.

Amazon region, Brazil.

Culex (Choeroporpa) chrysonotum Dyar & Knab.

Culex chrysonotum Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 57, 1908.

Northern South America to Panama.

Culex (Choeroporpa) taeniopus Dyar & Knab.

Culex taeniopus Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 100, 1907.

Melanoconion chrysothorax Peryassú, Os Culic. do Brazil, 244, 1908.

Tropical America.

Culex (Culex) lepostenis, new species.

Male hypopygium essentially as in *stenolepis* D. & K.; but the color of the adult differs so much as to require another name. In *stenolepis* the tarsi are broadly ringed with white at both ends of the joints, and the proboscis of the male has a broad white ring. In *lepostenis*, the tarsi are very narrowly white-ringed at the bases of the joints only, and the proboscis of the male is entirely black.

Type, male, paratypes, two males and two females, Cascajal River, Panama, May 30, 1908 (A. H. Jennings), originally determined by the late Frederick Knab as *rejector* D. & K., but without microscopic examination. The coloration is essentially as in *rejector*, and both species live in the water in the leaf-bases of arboreal Bromeliaceae.

From the description, evidently similar to *Melanocomion fasciolatus* Lutz (Imp. Med., Feb. 10, 1905); but the Lutz species is evidently a *Microculex* and not a *Culex*, having the appressed scales of the forked veins obovate. It may be an earlier name for *rejector*; but Brazilian males need to be examined.

***Culex (Microculex) imitator* Theobald.**

All the records in the monograph (Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iii, 434, 1915) for this species from Panama refer to *jenningsi* D. & K. *Jenningsi* is the Panama representative of *imitator* of Trinidad and the Guianas, and the two do not occur together. There are differences in the male hypopygium, which, while not great, are doubtless specific.

***Uranotaenia coatzacoalcos* Dyar & Knab.**

Uranotaenia coatzacoalcos Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 186, 1906

Uranotaenia basalis Howard Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iv, 917, 1917.

These two descriptions can be compared only in the larvae. In *coatzacoalcos*, we found the "upper lateral head hair" long and single, but short and double in *basalis*. I am of the opinion that we confused the homology of these hairs. The *coatzacoalcos* larvae are in Stage III, the *basalis* larva in Stage IV. Between these two stages, the elongation of the head occurs. Stage III head is not much longer than wide, if any. The thickened clypeal hairs are long and spine-like; there is a single hair at the margin of the eye-scar above the middle, and a multiple tuft posteriorly, near the angle of the head. In Stage IV the head is much longer than wide. The thickened clypeal hairs are shorter and thicker; there is a single hair near the center of the eye-scar, and a multiple tuft on the margin of the eye-scar above the middle. I do not detect any other hairs in this region in either mount. It seems probable that the elongation of the head has drawn the single hair from the margin across to the center of the eye-scar, and the tuft from the

angle of the head down to the eye-margin. If this be so, then the two hairs which we compared were not homologous, and the supposed specific difference between the larvae disappears.

This species appears to be confined to Mexico and Central America, no specimens having appeared from Panama as yet. Dr. Alfaro was able to send me a nice series of the species from Costa Rica.

Anopheles bellator Dyar & Knab.

Anopheles lutzii Theobald (not Cruz), Mon. Culic., i, 77, 1901.

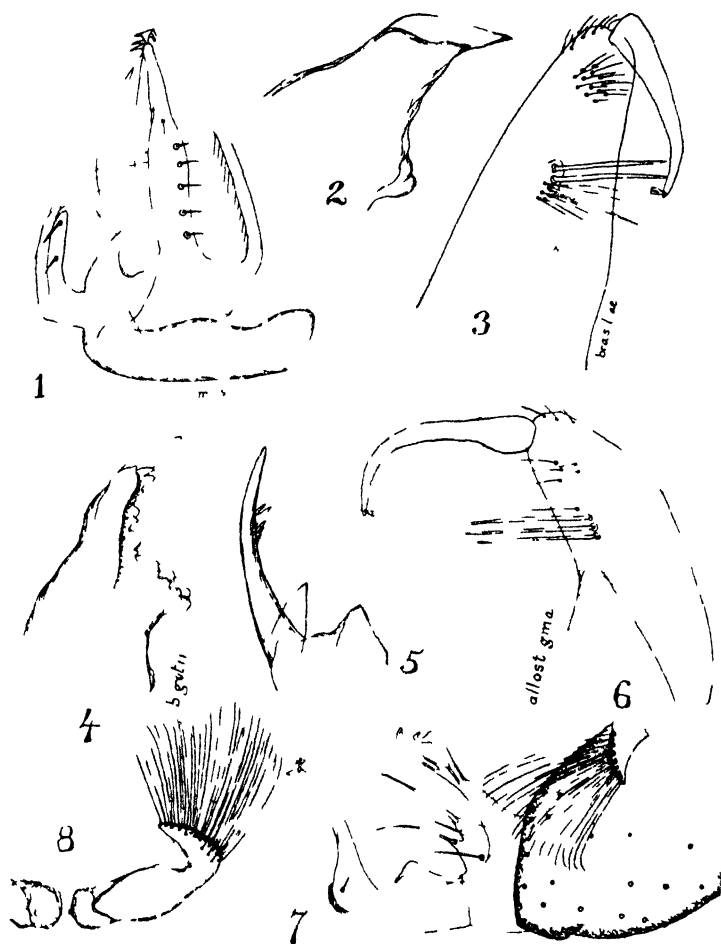
Anopheles bellator Dyar & Knab, Proc. Biol. Soc. Wash., xix, 160, 1906.

Anopheles cruzii Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 53, 1908.

Anopheles hylephilus Dyar & Knab, Ins. Ins. Mens., v, 38, 1917.

Anopheles neivai Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iv, 1986, 1917.

I cannot determine more than one species of *Anopheles* in Bromeliaceae, with slight local variation. The whitish shading on the third vein is distinct in the southernmost form (*cruzii*), in which the tip of the fifth hind tarsal is white. In Trinidad, the white persists on the third vein, though fainter, while the fifth hind tarsal is dark (*bellator*). Coming westward, we find *hylephilus*, described from Venezuela, Ecuador and Panama. Eliminating the latter locality, we find the third vein dark, or with only the faintest trace of white, the costal spots of the wing of good size, the outer three reaching the costal edge. In Panama, the coloration is the same, except that the wing-spots tend to be small, often breaking away from the costal edge. In the type of *neivai*, the two basal spots have so broken away; but in another, only the second spot has done so, while in a third the outer spot is missing. There is no constancy in the character, and I am inclined to refer all the Panama material to *neivai*, including those formerly listed under *hylephilus*, among which is one of the types of *hylephilus*. The specimens from Costa Rica mentioned in the monograph (vol. iv, p. 988) are in too poor condition to make out the characters, while those from Mexico were not bred to the adult state.



EXPLANATION OF PLATE V

- 1 Cheek piece of male of *Ch. (Ch.) (Ch.)* (D & K)
 2 Mes. of male of *Ch. (Ch.) (Ch.)* (D & K)
 3 Side piece of male of *Ch. (Ch.) (Ch.)* (D & K)
 4 Mes. of male of *Ch. (Ch.) (Ch.)* (D & K)
 5 Cheek piece of male of *Ch. (Ch.) (Ch.)* (D & K)
 6 Side piece of male of *Ch. (Ch.) (Ch.)* (D & K)
 7 Side piece and Tasper of male of *Ch. (Ch.) (Ch.)* (D & K)
 8 Ninth tergite of *Ch. (Ch.) (Ch.)* (D & K)

UNDESCRIBED SPECIES OF ANISOPODIDAE FROM NEW ZEALAND

(Diptera)

By CHARLES P. ALEXANDER

The new species of *Trichocera* described in this paper were included in collections of crane-flies received from Mr. W. George Howes, to whom my sincere thanks are extended for the privilege of retaining the types. The family name Anisopodidae is used instead of Rhyphidae, the genus *Anisopus* Meigen (1804) having undoubted priority over the genus *Rhyphus* Latreille (1805). This usage of the family name has been adopted by Knab, Edwards and other students.

Genus *Trichocera* Meigen

Trichocera howesi, new species.

Male.—Length about 2.6 mm.; wing 3.3–3.4 mm.

Female.—Length about 2.8 mm.; wing 3.5 mm.

General coloration dark brown, the pleural region a little paler. Halteres elongate, the knobs dark brown. Wings with a pale gray tinge, the veins slightly darker brown. Venation: *Sc* relatively short, ending near midlength of the basal section of R_2 , the latter more than three times R_{2+3} ; $r-m$ short, transverse, near midlength of cell 1st M_2 ; m about one-half the petiole of cell M_1 ; $m-cu$ about two-thirds the basal deflection of Cu_1 . In the left wing of the type, vein R_2 just before its tip bends caudad and fuses with R_{11} , completely closing cell R_2 .

Male hypopygium with the pleural appendage on the mesal face at about one-third its length produced into a slender, subacute, glabrous lobe; mesal face of the appendage distad of this with abundant microscopic setulae. Gonapophyses of the same general nature as in *T. maori*, forming large cushions, the armature reduced to abundant microscopic spinules.

Habitat.—New Zealand (South Island).

Holotype, ♂, Leith Valley, Dunedin, Otago, August 1, 1922 (Geo. Howes).

This very interesting crane-fly is named in honor of the collector, Mr. W. George Howes, to whom I am greatly indebted for many kind favors.

Trichocera lyrifera, new species.

Male and Female.—Length about 2.5 mm.; wing 3.6 mm.

Rostrum, palpi and antennae brownish black. Mesonotum dark brown, the pleura more brownish testaceous. Halteres with the knobs dark brown. Legs brown, the terminal tarsal segments darker. Wings faintly tinged with brown; stigma faintly indicated; veins darker brown. Venation: Sc relatively short, Sc_1 ending a short distance beyond the origin of R_2 ; basal section of R_2 about two and one-half times R_{2+3} ; $r-m$ perpendicular, inserted just before midlength of cell 1st M_2 ; petiole of cell M_1 nearly three times m .

Abdomen dark brown, the sternites paler. Male hypopygium with the pleural appendage cylindrical, slightly dilated on the mesal face at the base but not produced into a lobe, the entire mesal surface of the appendage provided with abundant, erect setae. Gonapophyses taken together lyriform, each a slender, strongly curved rod. Above the genitalia lies a microscopic, shagreened structure, deeply emarginate caudally, each lateral lobe thus formed produced into a needle-like point.

Habitat.—New Zealand (South Island).

Holotype, ♂, Leith Valley, Dunedin, Otago, July 20, 1922 (Geo. Howes).

Allotopotype, ♀.

Paratopotypes, 1 ♂, 1 ♀.

NOTES ON THE DIPTEROUS FAMILY HIPPOBOSCIDAE

By J. M. ALDRICH

There are extant two comprehensive tables of genera in this family: one by Speiser in Wiener Ent. Zeitung., xviii, 1899, 201; the other by Massonat, Annales Univ. Lyon, 1909, 234. Among several partial tables may be noted one for eight South American genera by Lutz, Neiva and Costa Lima, in Mem. Inst. Oswaldo Cruz, vii, 1915, 176. I have thought it worth while to prepare a new table, as none of these includes all genera now known. In this I have endeavored to arrange the characters so as to bring the less specialized forms at the beginning; inasmuch as specialization among these flies is in the direction of reduction, the more generalized forms are those with functional wings with comparatively complete venation, while the sheep-tick represents the last term of the series. *Lipoptena* is an isolated group, as shown by the venation, which is figured by Ferris and Cole, Parasitology, xiv, 184.

HIPPOBOSCIDAE

Table of Genera of the World

(Those not known from North America indicated by a star)

- a With functional wings.
 - b Wing with only three distinct veins behind the costa, which are the first, third and fifth, the alternating ones evanescent, with a long, oblique crossvein formed by the combination of the anterior and second basal. Type, *Lipoptena cervina* Nitsch = *Pediculus cervi* Linn. **LIPOPTENA** Nitsch.
 - bb Wing with five or six distinct veins behind costa
 - c With distinct, closed anal cell hence three crossveins—the anterior, second basal, and anal
 - d Ocelli wanting.
 - e Second basal crossvein midway between the other two; a large thick process on each side on the lateral lobe of the metanotum, above the metathoracic spiracle. Type, *Ornithomyia fulvifrons* Walk. **STILBOMETOPA** Coquillett.
 - ee. Second basal crossvein directly behind the anterior; without processes on the metanotum laterally. Type, *Pseudornithomyia ambigua* L., N. & C. L.,

***PSEUDORNITHOMYIA** Lutz, Nieva and Costa Lima.

- dd. Ocelli present.
- e. Third vein confluent with the costa for about one-third the length of the wing; first and third veins hairy. Type, *Ornithoica beccariina* Rond. = *Ornithomyia confluens* Say, ORNITHOICA Rondani.
- ee. Third vein joining tip of costal vein at a distinct angle.
- f. Second vein becoming confluent with costa a little beyond tip of first. Type, *Ornithomyia gestroi* Rond, *ORNITHEZA Speiser.
- ff. Second vein joining costa at a wider angle, more than halfway from first to third.
- g. Antennal processes straight, parallel, and very long—two-thirds as long as the head. Type, *Ornithomyia nitens* Bigot. ORNITHOPERTHA Speiser.
- gg. Antennal processes not nearly so long.
- h. Antennal processes narrow, without outer rim, widely divergent, curving downward. Type, *Hippobosca avicularia* Linn. ORNITHOMYIA Latreille.
- hh. Antennal processes concave above, broad, with projecting outer rim, curved mesially so as to touch or almost touch each other. Type, *Ornithomyia erythrocephala* Leach. ORNITHOCTONA Speiser.
- cc. With imperfect anal cell not closed by a crossvein, the other two crossveins mentioned under c are present, but the second basal may be partly pale in color.
- d. Wing "rilled" with about 30 delicate ridges proceeding from the region of the distinct veins obliquely toward the hind margin; head round and comparatively free from the thorax. Type, *Hippobosca equina* Linn. *HIPPOBOSCA Linnaeus.
- dd. Wing flat or with very few faint rills.
- e. Ocelli present. Type *Ornithophila vagans* Bond, *ORNITHOPHILA Rondani.
- ee. Ocelli absent.
- f. Clypeus (the sclerite anterior to the frontal suture) cleft almost to its base, its arms rounded, projecting like horns between the antennal processes at the sides and the median proboscis sheath. Type *Olfersia dioxyrhina* Speiser (New Guinea). *ICOSTA Speiser.
- ff. Clypeus not with such projecting arms.
- g. Claws bidentate, second basal crossvein directly behind the anterior. Type, *Olfersia phaneroneura* Speis. (Australia, on kangaroos). . . . *ORTHOOLFERSIA Speiser.
- gg. Claws tridentate, second basal crossvein far before the anterior.

- h. Clypeus elongated, about two-thirds as long as frons, acutely divided in the middle, concealing the base of the proboscis; lateral lobe of metanotum inflated and bearing a nipple-like protuberance below the side of the scutellum. Type, *Feronia spinifera* Leach (synonym, *Pseudolfersia* Coq., type *Pseudolfersia maculata* Coq.) *OLFERSIA* Wiedemann.
- hh. Clypeus very short, with widely rounded anterior margin showing the base of the proboscis; lateral lobe of metanotum somewhat convex but not bearing a process. Type *Feronia americana* Leach,

ORNITHOPONUS new genus.
- cc. With only one crossvein, the anterior.
 - d. Scutellum with prominent, square lateral angles behind; ocelli wanting. Type, *Lynchia penelopes* Weyenb,

LYNCHIA Weyenbergh.
 - dd. Scutellum rounded behind; ocelli present but minute. Type, *Lynchia pusilla* Speis,

MICROLYNCHIA Lutz, Neiva and Costa Lima.
- aa. With rudimentary or broken-off wings, and with halteres.
 - b. Claws simple beyond the basal plate (that is, bidentate).
 - c. Wings broken off, irregular stumps remaining.
 - d. With ocelli. Type above mentioned..... *LIPOPTENA* Nitsch.
 - dd. Without ocelli. Type, *Echestypus binoculatus* Speiser (in Africa, on antelope; the wing is unknown, presumably like that of *Lipoptena*) **ECHESTYPUS* Speiser.
 - cc. Wings very small, ocelli wanting. Type, *Allobosca crassipes* Speiser (On lemurs in Madagascar) **ALLOBOSCA* Speiser.
- bb. Claws with additional tooth inside, between the main one and the basal plate (that is, tridentate).
 - c. With ocelli; wings longer than abdomen but very narrow, seven times as long as wide, pointed. Type, *Hippobosca hirundinis* Linn. **STENOPTERYX* Leach.
 - cc. Without ocelli.
 - d. Wings rounded, long pilose apically, about half as long as abdomen, with only two veins behind costa. Type, *Myiophthiria reduroides* Rond (Oriental),

*MYIOPHTHIRIA Rondani.
 - dd. Wings narrow and pointed, as long as abdomen, with several veins. Type *Crataerrhina lonchoptera* Olf. = *Ornithomyia pallida* Latr. (Synonyms *Oxypterus* Leach and *Anoplera* Meig, both having the same type) .. **CRATAERRHINA* Olfers.

ddd. Wings minute, about as broad as long, projecting but little beyond the scutellum. Type, *Brachypteromyia femorata* Will., = *Anapera fimbriata* Waterhouse,

BRACHYPTEROMYIA Williston.

aaa. Without wings and halteres. Type, *Hippobosca ovina* Linn,

MELOPHAGUS Latreille.

NOTES ON THE GENERA

The status of *Pseudolfersia* is as follows: Originally included in *Olfersia* (as *Feronia*, preoccupied) were both *spinifera* and *americana*. When Coquillett established *Pseudolfersia* (Canad. Ent., xxxi, 336, Nov. 15, 1899) he designated *maculata*, new species, as type, which agrees with *spinifera* in characters, as distinguished in the above table. He evidently intended to leave *americana* in *Olfersia* as type. But unfortunately Speiser's table of genera contained the designation of *spinifera* as type of *Olfersia*, and came out July 31, 1899, almost four months ahead of Coquillett. Thus it results that *Pseudolfersia* is merely a synonym of *Olfersia*, and the group represented by *americana* (several species) has up to the present no generic name. The generic characters exist as seen by Coquillett, and if he had known of Speiser's designation in time he could easily have named *americana* as type instead of *maculata*. My new genus *Ornithoponus*, type *americana*, will fill the existing vacancy.

The genus *Ornitheza* is not known from North America, but includes *Ornithomyia butalis* Coq., from the Commander Islands. I erroneously supposed these islands to be North American when preparing my Catalogue, but they are near the Asiatic coast and should be relegated to the palaearctic.

Rondani described *Ornithophila vagans* from a single fly found in Italy, wandering on the limb of a tree. His type seems to be lost, and the species, the only one of the genus, has not been rediscovered. In the National Museum collection is a specimen from St. Helena, Bolivia, collected by Dr. Wm. M. Mann on the bird called huichi, which runs to this genus in the table.

Specimens of *Lipoptena* are not rare, and good series are sometimes obtained from deer, which they infest. Such series,

however, have almost invariably lost the wings, only stumps remaining. On July 4, 1917, near the summit of Mount Lowe, Southern California, I collected a winged specimen which I noticed hovering in the air in a shady spot. After it was in the cyanide bottle it rose on the wing and hovered in the middle of the bottle for an instant, a feat which I have never seen performed by any other fly.

Ornithoica conflucns Say is a widespread and well-known species, although not abundant in collections. It occurs on many hosts. Specimens in the National Museum are from Santiago de Cuba, without host; Hotchkiss, Colo., "on Hawk and Owl" (T. H. Cowen, through C. F. Baker); Ontario, Cal., on *Cypselus mexicanus* (Snodgrass); Philippine Ids., on *Halcyon* (Philippine Bureau of Science); and seven specimens from Tutuila, Samoa, on *Halcyon tutuilae* (Lieut. E. C. Reed, U. S. N.). Comparing this distribution with Austen's notes (Ann. and Mag. Nat. Hist., 1903, 263), it seems safe to assume the synonymy of Rondani's *beccarina*, described from Amboina. Schiner's *Ornithomyia pusilla* (Novara, 374) from Tahiti, on *Halcyon teneratum*, is also a synonym. Quite recently the species has again been redescribed by Ferris and Cole as *Ornithoica promiscua* (Parasitology, xiv, 203). Their specimens were from several hosts in California.

Say called the species *confluenta*, forgetting for the moment that the Latin participles have the same form for all genders. Wiedemann corrected the name to *conflucns*, adding in a footnote that Say's form was a slip of the pen or a misprint. I think we may go so far as to give a specific name the proper ending for gender without raising any question of rules.

Of the 24 genera now known, representatives of 18 are in the National Museum; the ones lacking are *Pseudornithomyia*, *Icosta*, *Echestypus*, *Stenopteryx*, *Myiophthiria*, and *Brachypteromyia*.

A NEW MICRODON FROM BOLIVIA ¹*(Diptera, Syrphidae)*

By RAYMOND C. SHANNON

A wonderfully striking species of *Microdon* was collected by Dr. W. M. Mann, while with the Mulford Expedition in Bolivia, 1921. The very unusual type of wing coloration singles out this species immediately, and as the writer is unable to find a description to fit the form, it is here described as new.

Microdon manni, new species.

Female.—Among the larger species, black with a large conspicuous preapical white spot on wings. Scutellum spined. Head broader than high, obtusely oval, face somewhat produced downward; face broad, parallel sided, eyes but little converging toward apex, the front being about two-thirds width of face; ocelli closely grouped and placed but little behind center of front; antennae elongate, cylindrical, first joint nearly as long as width of front measured across base of antennae, second joint small, but little longer than broad; third joint somewhat longer than combined length of first two; arista a little shorter than first joint; face with large dark brown spot which is bordered by a luteous V shaped marking; cheeks shining black. Mosonotum black, posterior margin of scutellum luteous, which color includes the two well separated, medium sized spines. Legs black, apices of femora and bases of tibiae brownish; fore and middle tarsi a little shorter than length of their tibiae; hind tarsi longer than hind tibiae. Basal two-thirds of wings pure black, a broad white spot extends from anterior to posterior margins, the parts of the veins covered by the spot yellowish; a distinctly smoky spot at apex of wing. Squamae and halteres blackish.

Length 16 mm., wing 13 mm.

One female, Ivon, Rio Beni, Bolivia; W. M. Mann, collector.

The coloration of *M. manni* makes it unique among our American Microdons. The species which most closely approach

¹Results of the Mulford Biological Exploration—Entomology.

it in coloration are to be found in the small group, *M. mirabilis* Will., *bertonii* Bezzi, *iheringi* Bezzi, recently worked up by Bezzi (Wien Ent. Zeit., 29, 319, 1910). However, the light preapical spot is represented by a narrow stripe extending across the wing. The scutellum in this group is unarmed.

Microdon bertonii Bezzi.

This species belongs to the group just mentioned. The specimens upon which Bezzi based his description lacked their antennae and as the National Collection now contains a pair of this species (det. by F. Knab) which have antennae, the writer is able to describe them. Antennae black throughout; first joint cylindrical, about two-thirds the width of front measured across antennal base; second joint small, broader than long; third joint in female broad, tapering at apex, more slender in the male, and about as long as first joint; arista as long as first joint.

NOTES ON GOELDIA

(*Diptera, Culicidae*)

By HARRISON G DYAR

The species of *Goeldia* (*Lesticocampa*) are predacious in the larval state, as far as known, and are addicted to the Sabethids or Culicids of certain plants. Consequently there exists a species for each plant, or rather for each group of species with a different habitat, since some of the victimized Sabethids inhabit water in dead tissues. The table of the male genitalia given in the monograph (Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iii, 163, 1915) is unusually perfunctory and inexact. The following will better separate the males at present known. Of the species mentioned by Bonne-Wepster & Bonne (Ins. Ins. Mens., x, 38, 1922), *vonplesseni*, *lineata*, *schedocyelia*, *trichopus*, *frontosa*, and *barancensis* are unknown to me in the male sex. Of the four last named, the male is undiscovered.

TABLE OF THE KNOWN MALES OF *Goeldia* (EXCEPT *lineata* PERR. AND
vonplesseni D. & K.)

Basal lobe of side piece wanting (male palpi short),

Isostomyia Coquillett.¹

An area of dense setae on inner side of side piece at base.

Tenth sternites with two teeth.....*homotina* Dyar & Knab

Tenth sternites with one tooth.....*perturbans* Williston

Without basal setae; two stout setae within near middle,

espini Martini

Basal lobe of side piece present (male palpi long)....*Goeldia* Theobald

Side piece with three stout setae within before middle,

longipes Fabricius

Side piece without three distinct setae so placed.

Basal lobes with very stout setae centrally; tenth sternites narrow.

Ninth tergites with seven longer setae.....*lunata* Theobald

Ninth tergites with seven rather short blades,

fluvialis Theobald

Basal lobes more uniformly haired; tenth sternites broad.

Side piece very long and slender (5 x 1); ninth tergite capitate with five setae.....*leucopus* Dyar & Knab

Side piece short (2 or 3 x 1); eighth segment normal.

Ninth tergites with eight setae; tenth sternites with four teeth.....*lampropus* Howard, Dyar & Knab

Ninth tergites with eleven setae; tenth sternites with eight teeth.....*rapax* Dyar & Knab

Side piece very short; eighth segment forming a chitinous ring; ninth tergites contiguous, each with eight short blades.....*pallidiventer* Theobald

¹ The International Commission has ruled that in case of misidentifications, the type of a genus is to be taken as the species named by an author, and not what he may actually have had before him. Therefore, the type of *Isostomyia* Coquillett is *Aedes perturbans* Williston, as stated in the monograph (Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iii 187, 1915). The use by me of the name as a subgenus of *Culex* (Ins. Ins. Mens., vi, 92 and 102, 1918) is not permissible. For *Isostomyia* Dyar (not Coquillett), the name *Aedinus* Lutz may be tentatively used. Gordon and Evans figure well the structures of their *Culex originator* (Ann. Trop. Med. & Par., xvi, 324, 1932), which species is presumably the same as *Aedinus amazonensis* Lutz, described from the same general region. There may, of course, be more than one *Culex* with short palpi in the male in the Amazon region; but until some differences have been pointed out between *originator* and *amazonensis*, they may be assumed to be the same. The structure of the clasper of *originator* agrees with my definition of *Isostomyia* (Ins. Ins. Mens. vi, 92, 1918).

Goeldia (Isostomyia) homotina Dyar & Knab.

Phoniomyia homotina Dyar & Knab, Proc. Biol. Soc. Wash., xix, 141, 1906.

Lesticocampa dicellaphora Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iii, 166, 1915.

Male hypopygium. Side piece conical, about two-and-a-half times as long as wide, constricted at base; a group of about 20 closely set large setae from conspicuous tubercles on the inner basal angle. Clasper as long as the side-piece, with long inserted terminal spine. Tenth sternites rather narrow, chitinized on one margin, ending in two widely spaced, distinct teeth. Ninth tergites low, much wider than long, approximate, each with five or six moderately long stout setae, which are not flattened nor blade-like. Eighth segment strongly chitinized, but of nearly normal shape. This agrees with the characters given in the monograph (vol. iii, p. 167) except as to the description of the ninth tergites (basal appendages). These were obscure in the old mount, and are corrected from a new one.

The larvae are predacious upon those of *Wyeomyia* (*Decamyia*) *eloisa* H., D. & K. and *W.* (*Hystatomyia*) *coenonius* H., D. & K. in the flower-bracts of *Calathea discolor*. No additional material is at hand since Jennings' rearings.

Goeldia (Isostomyia) perturbans Williston.

Aedes perturbans Williston, Trans. Ent. Soc. Lond., 271, 1896.

This species is not before me, but has been examined by Bonne-Wepster and Bonne (Ins. Ins. Mens., ix, 16, 1921). The larvae are predacious upon those of *Wyeomyia* (*Wyeomyia*) *pertinans* Williston, presumably in the leaf-bases of Bromeliaceae. The only known locality is the Island of St. Vincent, West Indies.

Goeldia (Isostomyia) espini Martini.

Lesticocampa espini Martini, Ins. Ins. Mens., ii, 65, 1914.

Trichoprosopon (*Joblotia*) *shropshirei* Ludlow, Psyche, xxvi, 168, 1920

The male structures have been described by Dyar and Ludlow ('The Military Surgeon, 1, 61, 1922). The life habits are

unknown; but the suggestion is ventured that the larvae are predacious upon those of *Wyeomyia* (*Prosopolepis*) *prolepidis* D. & K., "in cup-like shells which enclose the blooms of the seed-palm, which remain on the tree midway up, and readily catch and hold water" (The Military Surgeon, xlviii, 678, 1921).

Goeldia (**Goeldia**) **longipes** Fabricius.

Culex longipes Fabricius, Syst. Antliat., 34, 1805.

Lesticocampa ulopus Dyar & Knab, Proc. Biol. Soc. Wash., xix, 137, 1906

Lesticocampa culicivora Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 207, 1907

Lesticocampa ulopus was said to have the palpi of the female as long as six joints of the antennae; but reexamination of the type shows this to have been an error of observation. The palpi, measured from the tip of the clypeus, do not in the least exceed the length of four joints of the antennae. *Lesticocampa culicivora* was associated by the collector with "some unbred long-tubed larvae, probably a species of *Culex*," in flower-bracts of *Heliconia*. No *Culex* has since been found to breed in this plant, and the record is probably an error.

Male hypopygium. Side piece rather narrow, long and tapering; a group of coarse setae at tip within, another larger group from contiguous tubercles on the outer aspect toward base, and three very long flattened ones within. Clasper very long and slender, swollen at base, else uniform, curved before tip, and ending in a short, blunt inserted spine. Basal lobes low and rounded, with many coarse flattened setae. Tenth sternites moderately broad, strongly chitinized on one margin, with four stout terminal teeth and one or two very small ones. Ninth tergites with the chitinized portion about as broad as long, scarcely expanded outwardly, bearing five to seven stout setae, which are flattened, blade-shaped, with slender tips. Eighth segment chitinized, but wider than long and normally shaped.

The larvae feed upon those of *Wyeomyia* (*Decamyia*) *pseudopecten* D. & K. and *W. (D.) onidus* D. & K. in the flower-cups of several species of *Heliconia*. Our localities for

the *Goeldia* include Guatemala, Nicaragua and Panama. The victimized species of *Wyeomyia* and the host plant have a wider distribution, along the north coast of South America to Trinidad. It is probable that *Goeldia longipes* has a similar distribution. The species is also predacious upon *Wyeomyia* (*Calladimyia*) *melanocephala* D. & K. in "elephant's ear" (*Calladium*). Careful examinations reveal no differences in coloration or structure in the adults from the two plants. *Calladium* rearings are at hand from L. H. Dunn and J. B. Shropshire in the Canal Zone, Panama.

***Goeldia* (*Goeldia*) *lunata* Theobald.**

Wyeomyia lunata Theobald, Mon. Culic., ii, 279, 1903.

Described from females from Rio de Janeiro, Brazil.

Male hypopygium. Side piece rounded-conical, about twice as long as wide; setae rather coarse, some broad and flattened, evenly distributed; outer side scaled. Clasper longer than the side-piece, slender and curved, ending in a moderate blunt inserted spine. Basal lobes low and rounded, with about six long flattened setae centrally and small ones on the sides. Tenth sternites long, narrow, chitinized on one margin, with four terminal closely set teeth. Ninth tergites wider than long, approximate, with six stout terminal setae, which are slightly flattened and blade-like with slender tips. Eighth segment more strongly chitinized than the seventh, but only slightly so.

The larvae feed on those of *Culex* (*Microculex*) *imitator* Theob. in Bromeliaceae growing on trees (Peryassú, Os Culid. do Brazil, table insert at page 326, 1908).

Bonne-Wepster and Bonne describe the male hypopygium of this species (Ins. Ins. Mens., ix, 12, 1921), and remark that they find no differences from the structures of *rapax* D. & K. The differences are slight, as shown in the table, but I think they are of specific value.

***Goeldia* (*Goeldia*) *fluviatilis* Theobald.**

Goeldia fluviatilis Theobald, Mon. Culic., iii, 330, 1903.

Ictiocampa moralesi Dyar & Knab, Ins. Ins. Mens., vii, 3, 1919.

Known from Brazil and Guatemala, but nothing is on record concerning the feeding habits. Peryassú describes the adult only. Dr. Morales' specimens are without breeding data.

Male hypopygium. Side piece about three times as long as wide, conical, moderately broad, with small setae, scaled without. Clasper slender, as long as side piece, with long terminal spine over a quarter as long as the clasper, its tip clavate. Basal lobe small, narrowly conical, with three long wide and flattened setae at tip and fine setae on the sides. Tenth sternites long and very narrow, one margin chitinized, ending in two approximate teeth. Ninth tergites large, quadrate, approximate, with seven terminal stout flattened setae, which are not much longer than the tergites themselves, but flattened and blade-like, with slender tips. Eighth segment lightly chitinized centrally, scarcely modified.

The description is made from a Brazilian specimen. The Guatemalan form (*moralesi* D. & K.) may possibly be different.

Goeldia (Goeldia) leucopus Dyar & Knab.

Lesticocampa leucopus Dyar & Knab, Proc. Biol. Soc. Wash., xix, 137, 1906.

Described from Nicaragua and Panama. Additional material from Culebra and Empire in the Canal Zone (L. H. Dunn) and David, Panama (J. Zetek), is also all hand-caught, so that the life history is unknown. The adults differ from *longipes* not at all in coloration, but the hind legs are not ciliate. The genitalia are peculiar.

Male hypopygium. Side piece long and slender, at least four times as long as wide, with fine and coarser setae within; numerous coarse hairs without. Clasper unusually long and slender, with short blunt ovate terminal spine. Basal lobe broad and very low, with fine setae only. Tenth sternites large and very broad, one margin more chitinized than the other, having six terminal thorn-shaped oblique teeth. Ninth tergites slightly capitate, a little longer than broad, with six terminal, moderate flattened blade-shaped setae with slender tips. Eighth segment slightly chitinized, unmodified.

Goeldia (Goeldia) lampropus Howard, Dyar & Knab.

Lesticocampa lampropus Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iii, 167, 1915.

The description of the male structures given in the monograph need not be repeated. Some details are added in the table.

The larvae are predacious upon those of *Joblotia digitatus* Rond., in cocoanut husks and palm-spathes lying on the ground. Mr. Jennings says that they eat both the larvae and pupae. Mr. Shropshire has also bred the species.

Goeldia (Goeldia) rapax Dyar & Knab.

Lesticocampa rapax Dyar & Knab, Proc. Biol. Soc. Wash., xix, 137, 1906.

The description of the male structures given in the monograph has been supplemented by some details in the table.

The larvae are predacious upon species of *Culex* (*Microculex*) found in the water in epiphytic Bromeliaceae. This comes from Trinidad, and the habits are evidently identical with those of *Goeldia lunata* Theob. of Brazil. Details of the male structures differ, apparently to a specific degree, although Bonne-Wepster and Bonne (Ins. Ins. Mens., ix, 12, 1921) considered them identical.

Goeldia (Goeldia) pallidiventer Theobald.

Hyloconops pallidiventer Lutz in Bourroul, Mosq. do Brasil, 49, 1904 (nomen nudum)

Hyloconops pallidiventer Theobald, Mon. Culic., iv, 586, 1907.

Bonne-Wepster and Bonne remark (Ins. Ins. Mens., ix, 15, 1921) that the male genitalia are like those of *longipalpis* Theob. A specimen before me from Brazil differs, however, in the extremely short side pieces, which are scarcely longer than broad, and the distinctly long spine of the clasper. The eighth segment, too, is very strongly chitinized, and there are a number of other small differences. The species seems distinct. No data are at hand as to its life history.

Goeldia (Goeldia) vonplesseni Dyar & Knab.

Lesticocampa vonplesseni Dyar & Knab, Proc. Biol. Soc. Wash., xix, 137, 1906.

Hyloconops longipalpis Theobald, Mon. Culic., iv, 587, 1907.

Bonne-Wepster and Bonne remark (Ins. Ins. Mens., ix, 15, 1921) that the male structures are nearly indistinguishable from those of *rapax*. The species is not before me. The life history is unknown. I have not been able to place the species in the table.

Goeldia (Goeldia) lineata Peryassú.

Runchomyia lineata Peryassú, Os Culic. do Brazil, 266, 1908.

This was described from a male, but the hypopygium was not fully described nor figured, and I possess no specimens of the form. With the tarsi all dark, as described, and a yellow line down the middle of the mesonotum, it should be an easily recognizable species. Nothing about the life history is given.

ON AEDES RIPARIUS DYAR & KNAB

(*Diptera, Culicidae*)

By HARRISON G. DYAR

This species was described from examples of both sexes collected in Winnipeg, Manitoba, by Frederick Knab in 1907. The original type series mentions 68 specimens found "along the banks of the Assiniboine River among the trees." The assumption was that the species was connected with the river, and hence the name. There are 82 specimens in the collection now, collected by Knab at Winnipeg, but which are the original 68 types is not indicated. Only two specimens bear type labels.

In the monograph (Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iv, 714, 1917), we give the additional localities, Aweme, Manitoba, and Saxeville, Wisconsin. The two specimens mentioned from Aweme taken by Mr. Norman Criddle are before me, but the one from Wisconsin I do not find.

In the mosquitoes of the United States (Proc. U. S. Nat.

Mus., lxii, 80, 1922), I could not cite any United States records for the species, the specimen from Wisconsin having already disappeared then, or else it was a female and I was uncertain of the determination. In the same paper (p. 74), under *flavescens* Müll., I state that the two species are exactly alike in coloration, and liable to be confused.

On account of the unsatisfactory state of knowledge, an effort was made to follow up this species. In the spring of 1922 we went to Winnipeg, the type locality, early enough to find larvae, and later followed the species' distribution into the United States.

On becoming familiar with the species, there is no difficulty whatever in distinguishing it from *flavescens* (*fletcheri*). The difficulty was that in the *flavescens* series in the collection some *riparius* had been confused, so that my description of *flavescens* covers both species. To correct that description, the following changes are required in the paper:

Page 74, lines 23 and 24, for "sometimes" read "not," and for "diffused and with scattered scales," read "sometimes showing black longitudinal markings."

Page 74, lines 33-35, delete the sentence "Liable to be . . . coloration."

Among the specimens of *riparius* confused under *flavescens* are the ones from Fort Snelling, Minnesota. That record should be deleted under *flavescens*.

The larvae were found in early spring pools, particularly the shallow but large flat pools under scrub oaks that grow in groups on the prairie in the moister undulations of the plain, in the suburbs of Winnipeg. The prairie in this region is not yet bare, though the forest is breaking up and the conifers are gone. Large and small rounded thickets with sharply defined edges, composed of aspen, scrub oak, sugar plum, etc., occur. The pools have no connection whatsoever with the river, but are prairie pools. The Assiniboine here flows through a narrow gulch worn in the prairie, and forms no breeding-pools for mosquitoes whatever. Our conception of the species as ad-

dicted to river banks was therefore wholly wrong. The adults do frequent cover as well as open prairie; that is, they do not shun cover as *flavescens* does. The river gulch looks like an inviting place to collect, and so Mr. Knab collected his series there.

The larva has the head rounded, the antennae reaching about to the end of the mouth-brushes, slender, uniform, infuscated and coarsely spinose; a long spine at the tip. Head-hairs in twos, rarely one single. Body with the skin scarcely granular, nearly glabrous; lateral hairs single beyond the second segment; lateral comb of the eighth segment of seven or eight scales in an irregular row, each with very long central thorn, twice as long as the scale, with short fringing spines on the sides of the scale. Air tube about three times as long as wide, the pecten of about 12 teeth, followed by two, three, or four well detached ones, and the hair-tuft beyond, of three hairs and rather short, each tooth of the pecten with three to five branches at base. Anal segment with the plate coming near the ventral line, but not encircling, excavate posteriorly on the edge; brush with smaller tufts preceding toward base of the segment.

In the penultimate stage (Stage III), the larva presents some different characters. Head hairs 2-1 or 1-1; air-tube longer, about four times as long as wide; pecten in the same proportion, but the basal teeth smaller and more distant; tuft 2-haired; anal segment with the plate a dorsal saddle only, reaching about halfway down the sides; lateral comb of the eighth segment of about 12 scales, each with central stout thorn, longer than the body of the scale, with slight lateral fringes. Skin glabrous.

I have shown (Ins. Ins. Mens., x, 72, 1922) that *riparius* is allied to the European *maculatus* Meigen by the structure of the male hypopygium; but the larvae of the two are very different, *maculatus* having the comb of the eighth segment with many scales and the pecten of the air-tube without detached teeth. The air-tube itself, however, has much the same proportion in the two. The larva is quite distinct from all the American forms.

Leaving Winnipeg, we went to Warroad, Minnesota, a small hamlet on the south shore of the Lake of the Woods. The country here is forested, though there are some open spaces. The locality was especially favorable to *riparius*, much low land flooded by spring rains. The pools had just dried out, and the adults were starting on their migration flight. Under the trees, in leaves, in the grass along the moister parts of fields and ditches, they were present in numbers, both males and females in nearly equal proportion. Not flying much in the day, but on the alert and easily flushed up, only to settle on the grass or leaves again in a few seconds. Two hundred were taken along one lane in a quarter of a mile, without perceptibly affecting conditions.

Later, in an opening of the woods, after sunset, a number of males were found perched in the top of a dead willow bush, and flew out when the bush was shaken. No true swarms were seen, although they undoubtedly occur, for by the time dispersal was effected and swarming would begin, the species had become rare in the original locality.

Places visited later yielded the species in small numbers, biting by day or night, usually in open country. The adults, however, while at home on the prairie, also frequent the less shaded forest, as the following localities indicate.

ONTARIO:

White River, June 24, 1918 (H. G. Dyar)

Nipigon, June 26, 1918 (H. G. Dyar)

Dryden, June 30, 1918 (H. G. Dyar)

Kenora, July 2, 1918 (H. G. Dyar).

MANITOBA:

Whittemouth, May 11, 1922 (H. G. Dyar)

Winnipeg, June 22, 1907 (F. Knab).

Winnipeg Beach, July 5, 1918 (H. G. Dyar)

Aweme, June 1-25, 1904 (N. Criddle).

SASKATCHEWAN:

Saskatoon, August 11, 1918 (H. G. Dyar).

Prince Albert, August 14, 1918 (H. G. Dyar).

ALBERTA:

Red Deer, August 2, 1918 (H. G. Dyar).

Lamoral, August 6, 1918 (H. G. Dyar).

Lochearn, August 7, 1918 (H. G. Dyar).

WISCONSIN :

Saxeville, June 2, 1909 (B. K. Miller). [Specimen missing.]

MINNESOTA :

Warroad, May 22, 1922 (H. G. Dyar).

Fort Snelling, June 10, 1908 (E. B. Frick).

Thief River Falls, May 30, 1922 (H. G. Dyar).

Barnesville, June 2, 1922 (H. G. Dyar).

Crookston, June 1, 1922 (H. G. Dyar).

NORTH DAKOTA :

Fargo, June 12, 1922 (H. G. Dyar).

MONTANA :

Glendive, June 18, 1922 (H. G. Dyar).

This mosquito does not reach the Atlantic region, being lost in Ontario as the forest thickens eastward. It may, however, reach the Pacific coast, as there is a possibility that *aloponotum* Dyar from that region is the same thing. This I have not been able as yet to establish on account of not having any males of *aloponotum*.

NOTE ON THE HABITS AND DISTRIBUTION OF *AEDES FLAVESCENS* (MULLER) IN AMERICA

(Diptera, Culicidae)

By HARRISON G. DYAR

According to Dr. Wesenberg-Lund's account of the habits of this species in Europe, the males do not swarm, but rest singly on the under side of the tips of fern-fronds, waiting for the female to approach. I had not seen the action of the males in America until last summer. At Barnesville, Minnesota, there is a long and rather wide strip of land between the railroad tracks and private property which is low, and evidently held water early in spring. The area was dry at the time of my visit (June 2, 1922) and grown up to coarse grass and low weeds. After dark on that day a number of males of *Aedes flavescens* (*fletcheri* Coq.) were seen, resting near the tips of grass-blades or the upper leaves of weeds. On being approached, the male would fly away to another similar location.

No matings were observed; but there seems no doubt but that the males were behaving with us in the same manner as observed in Denmark.

A full list of American records of this species, as shown in the collection of the U. S. National Museum, follows. The records of *riparius* which had been included by mistake have been weeded out. Compare my paper of the mosquitoes of the United States (Proc. U. S. Nat. Mus., lxii, 74, 1922). The records given in the monograph (Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iv, 678, 1917) are all correct.

ONTARIO:

Albany, July 10, 1918 (H. N. Awrey).

MANITOBA:

Winnipeg Beach, July 5, 1918 (H. G. Dyar).

Winnipeg, June 22, 1907 (F. Knab).

SASKATCHEWAN:

Qu'Appelle, June 9, 1901 (J. Fletcher).

Prince Albert, August 15, 1918 (H. G. Dyar).

Pine Creek, July 12, 1903 (J. Fletcher).

Beaver Creek, July 22, 1917 (A. E. Cameron).

Belonge Creek, July, 1907 (V. A. Armstrong).

Saskatoon, June 18, 1918 (A. E. Cameron).

August 12, 1918 (H. G. Dyar).

Regina, June 23, 1903 (J. Fletcher).

Durs, June 13, 1918 (A. E. Cameron).

Carnduff, May 28, 1901 (J. Fletcher).¹

Oxbow, June 19, 1907 (F. Knab).

ALBERTA:

Olds, July 15, 1901 (J. Fletcher).

Edmonton, May —, — (C. F. Adams).

Red Deer, August 1, 1918 (H. G. Dyar).

Locheearn, August 7, 1918 (H. G. Dyar).

BRITISH COLUMBIA:

Mount Cheam, August 3, 1899 (J. Fletcher).

ALASKA:

Anchorage, June 10, 1921 (J. M. Aldrich).

MINNESOTA:

Warroad, May 26, 1922 (H. G. Dyar).

Thief River Falls, May 30, 1922 (H. G. Dyar).

Barnesville, June 2, 1922 (H. G. Dyar).

¹ The two types of *fletcheri* are also from Carnduff, labeled "July 6."

Beltrami, June 11, 1922 (H. G. Dyar).

East Grand Forks, July 24, 1921 (H. G. Dyar).

NORTH DAKOTA:

Fargo, June 12, 1922 (H. G. Dyar).

Devils Lake, July 19, 1921 (H. G. Dyar).

Pembina, May 21, 1922 (H. G. Dyar).

Mandan, June 24, 1922 (H. G. Dyar).

MONTANA:

Glendive, June 18, 1922 (H. G. Dyar).

Big Fork, ———, 1904 (E. Ricker).

The distribution is thus seen to be very wide in the north, reaching from Alaska to Hudson's Bay, but more and more restricted to the central plains southward. The species probably occurs at least in South Dakota, but I have no material from there.

NOTE ON *Aedes VINNIPEGENSIS* AND *HIRSUTERON*

(*Diptera, Culicidae*)

By HARRISON G DYAR

I originally described this from females as a small form of *Aedes hirsuteron* Theobald (Ins. Ins. Mens., viii, 34, 1919), and later referred it as a synonym of *aldrichi* (Ins. Ins. Mens., ix, 79, 1921, and Proc. U. S. Nat. Mus., lxii, 63, 1922). Males and larvae of the form were found at Warroad, Minnesota, adults appearing May 24-27, 1922. The larvae were in shaded shallow woods-pools, filled by rain, and entirely unconnected with flood-water. The country is low and flat; the only stream, small and sluggish, empties at this point into the enormous Lake of the Woods, so that flood-water is uncommon. The form *vinnipegensis*, therefore, is clearly not *aldrichi*, and is differentiated from *hirsuteron* in habit, by normally inhabiting spring-woods-pools. The larvae have the pecten of the air-tube not reaching beyond the middle of the tube, lateral tuft of the sixth segment double, skin sparsely pilose, agreeing with *hirsuteron* and not with *aldrichi*. It may be considered a race

of *hirsuteron*, small in size and living in early woods-pools instead of flood-pools of rivers. The position first assigned by me was the correct one.

At Winnipeg Beach and Aweme, Manitoba, all the adults taken were small. At Warroad, Minnsota, however, a majority of the captured adults were large or of normal size. Again, in marshy land at Warroad, which had been largely overflowed, either by flood-water or rain, several specimens of *Aedes trivittatus* Coq. were bred together with *vinnipegensis*. This species is a typical flood-pool breeder, and in this pool the full-sized *hirsuteron* may have developed. Therefore it appears that Warroad is at the meeting-point of normal *hirsuteron* and the small *vinnipegensis* form. Farther south, at Thief River Falls, Minnesota, *hirsuteron* was found breeding in normal flood-pools.

Recently (Ins. Ins. Mens., x, 83, 1922) I discussed the relationship of *hirsuteron* and *aestivalis* to the European *sticticus* Meigen. I have now examined a mount of the male hypopygium of the European form, and find the filament of the claspette widely expanded, short, the expansion forming a right angle, with distinct striae or ridges from the base, which run into the expansion of the filament as far as the angle. In the American forms the filament is longer, the expansion rounded, and there are no striae or ridges at the base, the structure being uniform except appearing thicker along the edge away from the expansion.

It is therefore clear that *hirsuteron* Theobald is distinct from the European species. I am unable to demonstrate any differences in *aestivalis*, which may be referred to the synonymy of *hirsuteron*. This will necessitate the following changes in my paper on North American mosquitoes (Proc. U. S. Nat. Mus., lxii, 1-119, 1922):

Page 61, line 3 from bottom, insert "*Culex aestivalis* Dyar, Journ. N. Y. Ent. Soc., xii, 215, 1904" from page 62 line 31.

Page 62, delete lines 30, 32-34 inclusive.

Also line 23 for "South Dakota" read "Minnesota."

The following new localities may be added to those given on page 62:

NEW MEXICO:

Las Vegas Hot Springs, August 9, — (H. S. Barber).

MISSISSIPPI:

Aberdeen, May 21, 1911 (A. K. Fisher).

MARYLAND:

Cabin John Bridge, April 28, 1912 (Knab & Malloch).

Hyattsville, May 29, 1911 (F. Knab).

NEW YORK:

Rochester, July 3, 1901 (W. V. Ewers).

MONTANA:

Livingston, June 25, 1922 (H. G. Dyar).

Poplar, July 14, 1921 (H. G. Dyar).

Glasgow, July 11, 1921 (H. G. Dyar).

MINNESOTA:

Moorehead, July 26, 1921 (H. G. Dyar).

Thief River Falls, May 30, 1922 (H. G. Dyar)

Crookston, June 1, 1922 (H. G. Dyar).

Warroad, May 28, 1922 (H. G. Dyar).

Rochester, June 5, 1922 (H. G. Dyar).

REMARKABLE CHALCID-FLIES COLLECTED IN NORTHERN AUSTRALIA BY A. P. DODD

(*Hymenoptera*)

By A. A. GIRAULT

These species had escaped my utmost efforts in collection, and were taken, I believe, solely on tree-trunks in jungle, Queensland. They are all more or less peculiar, and help materially to complete my rolls of the Australian species, full but by no means complete. The types are in the Queensland Museum.

Metapelma columbi, new species.

As *westwoodi*, but ovipositor as long as body, basal sixth brown, base tibia 3 not white but dorsal edge of the dilation from base to apex; scrobes as in *superba*, axillae rather widely separated. Scutum with a median ridge from whose sides, like tree-branches, silvery hairs proceed. Legs concolorous save 1 of

tarsus 2. Scape cylindrical, long. Postmarginal distinctly shorter than marginal.

Kuranda.

Eusandalum compressistylus, new species.

Ovipositor half the abdomen, the compressed punctulate stylus nearly as long as it; as *stylatus* otherwise, but stigmal more slender, facial sculpture coarser, fore wing with mid-longitudinal fuscous stripe, legs except coxae, brown, abdomen proximad of stylus with uniform cross-lineolation (in others, segment before stylus densely pin-punctate), the stylus with no median carina.

Cerambycocobius bilongifasciatus, new species.

As *pax*, but head still more rounded, fore wing entirely sooty save for a wide mid-longitudinal hyaline stripe from bend of submarginal; ovipositor a third longer than abdomen; tibiae 1-2 concolorous widely at base.

Eupelmus longifasciatipennis, new species.

As *insularis* but abdomen unmarked, ovipositor just extruded, white; abdomen widest at middle, slender; fore wing with a mid-longitudinal fuscous stripe nearly to apex from caudal margin opposite bends of submarginal. Scape slender. First five antennals and legs save coxae, yellowish white. Funicles 2 and 4 longest, twice longer than wide, subequal pedicel. Postmarginal distinctly exceeding the elongate stigmal. Coxae 2 white. Discal cilia of fore wing to base. Finely scaly. Sides of scrobicular cavity strongly carinated; an obtuse median ridge through the shining cavity

Eupelmus bicinctipilum, new species.

As *giottini* but abdomen narrow, distinctly widest before apex, less depressed; ovipositor elongate, curved, exceeding abdomen. Postmarginal over twice the stigmal; second fuscous stripe nearly twice wider than first. Scape white save distal third above and ventral edge save at each end; abdomen ventrad white at basal half, produced triangularly beneath at middle.

Ocelli in an equilateral triangle. Ovipositor black with two white cincti, 1 shortest, twice longer than wide, apex basal third, 2 over twice longer than 1, at base distal third, nearly equal black distad of it. Tarsi save 1 in tarsi 1 and 3 except each end, tip tibia 2 rather widely, white. Scape slender, curved; pedicel subelongate, exceeding funicles, of which 2 is twice quadrate 1, 3 longest, over twice longer than wide, equal 4, a bit shorter than pedicel. Pilose. Fore wing ciliated to base, a short hairless line from apex submarginal.

Kuranda.

Eupelmus napoleoni, new species.

As *grotii* but ovipositor half longer than abdomen; stigmal long, curved, knob acuminate. Wings subhyaline, veins pale. Legs brownish yellow save coxae, femora 1 and 3 (except latter sometimes and except apex) and tibiae 1 and 3 obscurely at base. Funicles 3-4 longest, nearly as long as pedicel, over twice longer than wide, 8 a half longer than wide. Scape obclavate. Postmarginal twice the stigmal. Face below antennae and thorax below mesopleurum, with noticeable silvery pubescence. Coxae 1 and 3 bearded.

Eupelmus partisanguineus, new species.

Fore wing infuscated from bend of submarginal to apex, the infuscation yellow to apex marginal, from thence sooty. Stigmal subsessile, postmarginal very elongate. Ovipositor nearly as long as abdomen, latter cylindrical, thicker at base, exceeding thorax. Frons moderate. Large, purple, red as follows: Ovipositor valves save apex widely, scape, pedicel, funicles 1 3, prothorax, legs save lateral aspect coxa 3, scutum except lateral aspect of each ridge widely at distal third, a narrow stripe along under mesopleurum, space between axillae and wings, propodeum, propectus, basal third abdomen. Usual otherwise but ridges of scutum closer to meson than usual. Funicle 1 quadrate, 2 elongate, exceeding the compressed scape, rest shortening, 2 over four times the pedicel, 8 twice longer than wide.

Kuranda.

Eupelmus nonaericeps, new species.

Fore wing nearly uniformly lightly infuscated throughout. Postmarginal about twice the long, curved, beaked stigmal. Scape with a linear exfoliation, greatest at basal two-thirds. Ovipositor equal abdomen, basal sixth, distal two-thirds black, second sixth brownish. Orange, thorax with a purplish sheen, purple as follows: Tegulae, propodeum save cephalad, coxa 3 above, ocellar area, abdomen above for proximal five-sixths save margins narrowly, apex of abdomen. Scrobes obscure. Subglabrous. Frons moderately wide, lateral ocelli halfway between eye and cephalic ocellus. Abdomens 2-4 bilobed behind. Flagellum black, funicles 2-4 equal, two-and-a-half times longer than wide, 8 equal pedicel. Fore wing ciliated to base, the submarginal setae gross. Large species.

Kuranda.

Metapelma longfellowi, new species.

As *superba* but half smaller, ovipositor somewhat exceeding abdomen, the fourth fifth white; lateral ocelli closer than each is to the cephalic, frons therefore narrower; discal cilia under marginal not scale-like, only stout; a very large bristle at caudal margin half way to discal cilia from base.

Kuranda.

Borrowella, new genus (Encyrtini).

As *Aenasiella* but frons narrow, jaw teeth bare unequal, marginal a half plus larger than wide, much shorter than the slender, straight, long stigmal, the postmarginal elongate, distinctly exceeding stigmal.

Borrowella bioculata, new species (genotype).

Purple, scape, legs save femur 1 widely at apex, reddish brown, funicle whitish, 1 dusky; fore wing dark from apex submarginal to apex, two large, irregular eye-spots, opposite margins, one at apex marginal. Finely scaly. Funicles 1-2 a third longer than wide, shorter than pedicel, 6 wider than long.

Palpi dark. A line of discal cilia nearly to base from main ciliation along submarginal.

Kuranda.

Borrowella punctatinotum, new species.

As *bioculata* but scape cylindrical, ovipositor extruded two-thirds abdomen; coppery, abdomen purple, scutum, pronotum with coarse umbilicate punctures, sparse and rather obscure on scutellum, smaller but nearly as dense on frons; funicles 1 and 6 black; jaw-teeth larger, infuscation of fore wing with only the caudal eye-spot, this less distinct; pedicel somewhat longer.

Kuranda.

Eucomomorphella, new genus (Encyrtini).

As *Eucomys* but metallic, jaws with three long, acute teeth, scutellum simple, wings simple, hind legs as in *Metapelma*, postmarginal nearly twice the long, curved stigmal. Ovipositor free, scutum large.

Eucomomorphella emersoni, new species.

Aeneus, first two legs, antennae reddish brown, coxae save base of 3 narrowly, silvery; hind legs entirely purple save linear exfoliation of femur and tibia, this white; tibial spur (middle legs) dark at tip. Head punctate. Femur 2 and proventer, silvery. Fore wing sooty from base of stigmal nearly to apex. Tegulae white at apex. Thorax pilose, minutely punctate. Scutellum, axillae more densely pilose, dark velvety green. Funicle 1 nearly thrice longer than wide, nearly twice pedicel, 6 a bit wider than long. Clubs 2 and 3 very many times wider than long, curved. Jaw 1 largest. Hairless line closed at caudal margin by 4-5 lines. Costal cell wholly ciliate.

Kuranda.

Insecutor Inscitiae Menstruus

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Nos. 7-9

GENERA OF NEARCTIC CALLIPHORIDAE, BLOW-FLIES, WITH REVISION OF THE CALLIPHORINI

(*Diptera*)

By RAYMOND C SHANNON

The excellent treatise by Dr. Garry de N. Hough on this group, "Synopsis of the Calliphorinae of the United States" (Zoological Bulletin, II, 283-290, 1899), is the only comprehensive work on our genera and species that has appeared. Nearly twenty-five years have elapsed during which about a fifty per cent increase in the number of genera and species have been found in North America. Likewise additional characters have come to light which more clearly classify the forms. As Hough's paper is now out of print a new synopsis of the group, embodying the new forms and characters, seems a timely matter. The present paper contains a great deal that is the work of Dr. J. M. Aldrich. Three of the species of *Steringomyia*, recorded below, besides almost the only known specimens of *Calliphora* (*Cynomyia*) *elongata* Hough, were obtained through his collecting. The discovery of the main generic character used in the key for *Cochliomyia* should be credited to him, although Townsend erected the genus. Most of the characters of the male genitalia and the character of "stem vein ciliated," here used by the writer, were pointed out to him by Aldrich. Most of the synonymy was obtained from Aldrich's card index, and this is indicated in the proper places. Credit should also be acknowledged for his efforts, in conjunction with Villeneuve, in ascertaining the relation of the species of *Steringomyia* and

Onesia to European forms. Much appreciation is due Dr. J. Villeneuve for making these necessary examinations and for his opinions.

Mr. J. R. Malloch was the first to point out the character used for *Lucilia*, i. e., the hairy chitinized patch between the squama and post alar declivity; besides the hairy post alar declivity and the single convexity of the metanotum, two characters common to most Calliphoridae and their allies.

STATUS OF THE FAMILY AND GENERA OF CALLIPHORIDAE

The family Calliphoridae may be defined as follows: Cycloraphous flies with large squamae; hypopleural bristles present; sternopleurals arranged 2:1; plumose arista; metanotum with a single convexity; tuft of hairs on post-alar declivity (except one or more species of *Protocalliphora*); a small patch of inconspicuous setae on metanotum below each squama; prosternum (between fore coxae) pilose; propleura entirely clothed with pile, besides having the usual bristles on the lower propleura, i. e., the restricted area immediately above coxae; metallic light green to dark blue in color.

The pilose prosternum and upper propleura are here proposed for the first time, as far as the writer is aware, as the limiting family character for the group. The pilose prosternum appears to be common to all of the American flies which may properly be considered as belonging to the Calliphorid group, even the testaceous *Mesembrina* and allies. This character appears to segregate the Calliphoridae from all other American Muscoid Diptera except a few genera of Muscidae (sensu vero) which are eliminated by the absence of hypopleural bristles, and some of the more bristly Tachinidae which could not be confused because of their bare arista and hind coxae pilose on posterior side. *Pollenia*, as well as the Sarcophagidae, Dexiidae and most Tachinidae have the prosternum and upper propleura bare. The Anthomyidae and some Muscidae also have these parts bare. *Pollenia*, because of its grayish, non-metallic coloration, sternopleurals arranged 1:1 and unique

parasitic habits (parasite of earthworms) is manifestly an unnatural element in the Calliphoridae,¹ all of which are of some metallic shade of blue or green and usually breed in either living or dead flesh of vertebrate animals.

Two subfamilies and four tribes are present in our fauna. The Phorminae containing the tribes Chrysomyini, screw worm flies; and Phormini, in which some of the species have larvae parasitic on nestling birds. The Calliphorinae are also represented by two tribes in North America, the Lucilini which frequently adopt the parasitic habits of the screw worm flies and are a great pest on sheep at times, and the Calliphorini or typical blue bottle flies. The genera of Calliphoridae which occur in North America appear to be restricted to the holarctic region. In South America the "blow-flies" are represented by the *Mesembrina* and allies (a group which Aldrich has recently revised), and the Lucilini and Sarconesini. A few species of Calliphorini are known to occur in the Neotropical region but material is not at hand and they have been left out of consideration in the present paper. They appear to be confined to high altitudes

The genera previously unrecorded for America are *Borecellus*, possibly unique to the boreal region; and *Steringomyia* and *Oncsia*, both well known European genera. The appearance of the latter genera in America is really a matter of note; we now have authentic records of four species of *Steringomyia* and two of *Oncsia*, all but one of *Steringomyia* being obtained only during the last five or six years. A number of the genera, or so-called genera, are monotypic for North America, and this fact, together with the revision given for the Calliphorini, makes the present treatment complete for the Nearctic Calliphoridae except the species of *Lucilia*.

Townsend has recently described a new species of *Calliphora*.

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¹ *Melanodexia*, Dexiidae, appears to have more in common with *Pollema* than with other Dexiidae. The heads of the two resemble each other closely and they agree otherwise, even to having the post alar declivity hairy (which is not the case in the true Dexiids) except for the absence of the small patch of hairs below the squama in *Melanodexia*.

texensis, based on five specimens from Texas. The specimens prove to be *Cynomyia cadaverina* Desv. His species, *Calliphora* (*Musca*) *rubrifrons*, is none other than *C. vomitoria*. The character of red frons, whereby he distinguished the species, is peculiar only to somewhat teneral specimens. Likewise the species he described from Mexico and Costa Rica, *Calliphora irazuana*, is *vomitoria*, or, at best, it is merely a variety of *vomitoria* of the black beard form and otherwise distinguished by its darker wing bases. Townsend has erected the genus *Cynomyiopsis*, to contain *Cynomyia cadaverina*, *Calliphora elongata* and *Steringomyia popoffana*, an unnatural group for which we have no need and the name is here made a synonym of *Cynomyia*. Also there is no need for his genus *Eucalliphora*, described for *Calliphora latifrons*, on the basis of a secondary pair of ocellar bristles. These bristles are present in all of the Calliphorini, although usually they are much weaker and not well differentiated from the surrounding hairs. Coquillett's species, *Calliphora lata*, described from Japan, also appears to be a synonym of *vomitoria*. It might be considered a variety characterized chiefly by its more yellowish and somewhat shorter forceps of the male.

A very curious situation exists in the genus *Calliphora*. Most of the specimens of *C. vomitoria*, *erythrocephala* and *viridescens* in collections are females, while those of *coloradensis* are males. The species are very closely related, separated on what appeared to be slight and probably variable, or secondary sexual characters. It was thought that both *viridescens* and *coloradensis* would prove to be synonyms of *erythrocephala*. A character apparently insignificant in itself, however, was found for *erythrocephala* which appears constant for this species and on the basis of this character (the basicosta, which overlaps the extreme base of the costal vein, is yellow and the alar epaulet, immediately basad of the basicosta, is more or less yellow; in all other species black) the specimens of *erythrocephala* were segregated, leaving the characters of the two other species showing to much better advantage as constant specific struc-

tures. Certain individuals, both sexes, of *Calliphora vomitoria* have pure black beards; hence it is necessary to rely on the number of intra alar bristles to separate them from *viridescens*, as well as the forceps of the males which offer the best diagnostic characters. These black bearded specimens occur in various parts of the country, and in order to emphasize that such forms occur and are liable to be confused with *viridescens*, as they have been in the past, a varietal name, *nigribarba*, is proposed for them. *C. morticia*, a new species herein described from Alaska, may be confused with *nigribarba* but the parafacials of *nigribarba* are three times the narrowest width of the front in the male; the subquadrate bucca of this form is noticeably longer than broad in *morticia* and the male forceps further distinguish them.

Certain biological features have recently been noted in the Calliphorini. Parker in *Psyche*, p. 127, 1922, points out the possibility of pedogenesis in *C. erythrocephala*. *C. latifrons* appears to be larviparous, likewise *Steringomyia aldrichia*. Females of both species, in the collection, have early stage maggots protruding from their ovipositors.

The number of bristles in what has here been termed the sublateral row (Pl. VI) appear very constant in the genera *Cynomyia*, *Steringomyia* and *Calliphora*, numbering one, two and three, respectively, and are used as the main means of classifying them. The only exception to this character among these genera so far noted occurs in the single male specimen we possess of *Steringomyia alaskensis*. A very much reduced pair of anterior sublaterals (normally absent in this genus) is present on this specimen. Additional material may prove this pair normally absent for this species. These bristles in *Onesia*, however, differ in number, according to species, ranging from one to three. They also show some variability within the species. *Onesia* appears the most plastic of the Calliphorini, showing variations in other respects. Even the male genitalia are much more varied among the species than in the other genera. In our recently imported *O. agilis* Mg. and *aculcata*

Pan. there are three sublaterals. These two species are well characterized by their elongated front, black head and rather small antennae. The bristling of the fore tibia also shows good generic diagnostic characters for the first three genera, but in *Onesia* they vary from one to two, usually one.

The characters used to separate the Phorminae from the Calliphorinae are rather difficult of discernment but are apparently the most reliable. The one "stem vein ciliated"¹ is found on the upper side of the wing; while the subcosta sclerite with small black bristles² is on the lower side. So one or the other character may be seen regardless of the position of the wing.

The post alar declivity is pilose in all the Calliphoridae except in our one or more American species of *Protocalliphora*. The European species of this genus, *coerula* and *azurea*, besides having the post alar declivity sparsely pilose, have fairly long sparse black pile on the anterior end of the membrane between the squama and thorax. This pile is absent in our American species. Considering these two differences it appears certain that we do not have either of the European species.

KEY TO THE GENERA OF CALLIPHORIDAE

(Where there is only one North American species it is noted in parenthesis.)

- A. Upper side of stem of first vein ciliated; subcosta sclerite with small black bristles.
 - B. Face yellow with yellow pile; anterior portion of lower squama pilose; one post-humeral bristle.
 - C. Palpi normal with well scattered bristles; three or four propleural bristles; post-thoracic spiracle light-colored with a row of black hairs along its lower margin. (*Chrysomya fulvipes* Mg. [*wheeleri* Hgh., syn. by Aldrich]), *Compsomyiops* Townsend
 - CC. Palpi about one-third normal size with bristles placed on outer third; post-thoracic spiracle darkened. (*Chrysomya macellaria* Fab.).....*Cochliomyia* Townsend

¹ The stem vein is the basal part of the first longitudinal vein which appears a part separated from the rest of the vein by a fairly distinct line or suture which is opposite the humeral crossvein. The cilia are fine hairs.

² The subcosta sclerite in the Calliphoridae is an elongate triangular piece extending from the basicosta to the first vein.

- BB. Face black with black hairs; lower squamae bare; usually two post-humeral bristles.
- C. Squamae white; anterior acrosticals well distinguishable from surrounding hairs.
- D. Four intra-alars; six or more marginal scutellars; prothoracic spiracle dark orange to black. (*metallica* Tns.) *Protocalliphora* Hough
- DD. Two intra-alars; four marginal scutellars; prothoracic spiracle distinctly light orange colored. (*regina* Mg.)
Phormia Townsend
- CC. Squamae darkened, disc of upper squama thinly pilose; anterior acrosticals not distinct from surrounding hairs; prothoracic spiracle black.
- D. Arisal rays closely applied to arista; face much produced below, making the head as high as broad; prothoracic spiracle noticeably larger than third antennal joint (*aristatus* Ald. & Snn. [*Phormia coerulea* Mall., preoc.]) *Borellus* Ald. & Snn.
- DD. Arisal rays well separated; face moderately produced below, noticeably broader than high; prothoracic spiracle about size of third antennal joint. (*terracenovae* Desv.) *Protophormia* Townsend
- AA. Upper side of stem vein bare; subcosta sclerite faintly pubescent; one post-humeral bristle.
- B. Upper surface of lower squama bare; a small chitinated hairy patch present on posterior end of the membrane between lower squama and lower margin of the post-alar declivity. (*caesar*, et al) *Lucilia* Desvoidy
- BB. Upper surface of lower squama distinctly pilose; above mentioned patch absent.
- C. One sublateral; two bristles near middle on exterior surface of front tibia *Cynomyia* Desvoidy
- CC. Two or three sublaterals; one, rarely two, bristles midway on exterior surface of fore tibia.
- D. Two sublaterals (*Acrophaga* BB.)
Stringomyia Pokoray
- DD. Three sublaterals.
- E. Last section of fourth vein straight or but very slightly curved; antennae black, small, third joint only as long as dorsal bristle of second joint.
Onesia Desvoidy
- EE. Last section of fourth vein with a decided bend; antennae normal in size, third joint much longer than bristle of second joint. . *Calliphora* Desvoidy

SYNOPSIS OF CALLIPHORINI

Males

- A. Outer forceps very elongate; inner ones rudimentary; one sublateral *Cynomyia*
- B. Entire front of head, bright golden yellow with silvery pruinosity *mortuorum* Linne
- BB. Facial plate dark, genae reddish brown.. *cadaverina* Desvoidy
- AA. Outer forceps not very elongate; inner ones well developed, being nearly as long to longer than outer; two or three sublaterals.
- B. Lobes of fifth sternite very prominent, obtusely rounded apically; two sublaterals..... *Steringomyia*
- C. Narrowest width of front much broader than width of parafacials; bristles on parafrontals continue all the way to the inner verticals; lower half of parafacials distinctly reddish brown; inner forceps longer than outer; squamae white *alpina* Zett
- CC. Narrowest width of front not broader than parafacials; bristles on parafrontals and below level of anterior ocellus; parafacials black; squamae darkened.
- D. Parafacial broader than narrowest width of front; inner forceps as long as outer, much broadened basally, flat, in outline pear-shaped..... *alaskensis*, n. sp.
- DD. Parafacial of same width as narrowest part of front; forceps very slender, about two and one-half times as long as combined width; inner ones much shorter than outer..... *aldrichia*, n. sp.
- BB. Lobes of fifth sternite inconspicuous, appressed, except *elongata* which has them truncate; three sublaterals.
- C. Last section of fourth vein straight or only slightly bowed inward; third antennal joint small, about as long as dorsal bristle of second antennal joint; forceps small..... *Onesia*
- D. Third antennal joint distinctly longer than width of parafacial; wings and squamae smoky; forceps very small, outer ones rounded apically, their basal halves overlapped by hypopygium..... *aculeata* Pandell
- DD. Third antennal joint slightly shorter than width of parafacial, wings and squamae very slightly tinged; forceps not unusually small, outer ones pointed, thick and irregular in outline; inner ones more deeply inset than outer..... *agilis* Meigen
- CC. Last section of fourth vein with a decided bend; third joint normal sized, much longer than bristle of second joint *Calliphora*

- D. Front of head bright orange with silvery pruinescence; pair fronto-orbitals; only five pairs of frontals; forceps moderate, of equal development, slender and curved apically; squamae white.....*elongata* Hough
- DD. Front of head partly black; no fronto-orbitals; squamae darkened.
- E. Narrowest width of front over twice as broad as parafacial; a well differentiated pair of secondary ocellars placed immediately behind post-ocelli; forceps very small; outer ones nearly bare; inner ones very hairy on post-aspect...*latifrons* Hough
- EE. Narrowest width of front much less than twice width of parafacial; secondary pair ocellars not well differentiated from surrounding hairs.
- F. Three intralars; basicosta black; outer forceps well provided with long, loose hairs.
- G. Narrowest width of front broader than width of parafacial; bucca mostly reddish; outer forceps regular in outline, obtusely pointed.....*coloradensis* Hough
- GG. Narrowest width of front less than half the width of parafacial; bucca black; outer forceps suddenly curved at apex, sharply pointed.....*viridescens* Desv.
- FF. Two intralars.
- G. Basicosta yellowish; outer forceps with long loose hairs, broad, obtusely rounded at apex; bucca red..*erythrocephala* Meigen
- G. Basicosta black; bucca black.
- H. Parafacials black; outer forceps straight, comparatively broad, gradually tapering to obtuse point, clothed with short stiff hairs,
morticia n. sp.
- HH. Lower half of parafacials red; outer forceps gently curved, very slender, sharply pointed, nearly bare,
vomitioria Linne
- I. Beard red.....*vomitioria vomitioria*
- II. Beard black,
vomitioria nigribarba n. var.

TABLE OF FEMALES

- A. One sublateral; two bristles about midway on exterior side of fore tibia*Cynomysia*

- B. Entire front of head bright orange yellow.....*mortuorum* Linne
- BB. Front and facial plate black.....*cadaverina* Desv.
- AA. Two or three sublaterals; one bristle midway on outer side of fore tibia.
- B. Two sublaterals; slender species.....*Steringomyia*
- C. Plumosity of arista two-thirds normal length; squamae white*popoffana* Tns.
- CC. Plumosity normal; squamae darkened.
- D. Lower fronto-orbital on level with fifth frontal; disc of fourth segment with strong bristles and sparse, short hairs*aldrichia* n. sp.
- DD. Lower fronto-orbital on level with sixth frontal; disc of fourth segment conspicuously haired, bristles weak. Probably female of.....*alaskensis* n. sp.
- BB. Three sublaterals, usually robust species.
- C. Last section of fourth vein very slightly bowed inward; antennae black, small, third joint only as long as bristle of second joint; frontal vitta twice as long as broad; rather small species.....*Oncsia agilis* Meigen
- CC. Last section of fourth vein with a decided bend; antennae of normal size, partly red; frontal vitta less than twice as long as wide.....*Calliphora*
- D. Post-margin of second tergite without long bristles except at sides; squamae white; basicosta yellow,
elongata Hough
- DD. Post-margin of second tergite with appressed long bristles extending across; squamae darkened.
- E. A strongly differentiated pair of secondary ocellars placed immediately behind post-ocelli; bristles on facial ridges well developed, lower ones longer than width of parafacial.....*latifrons* Hough
- EE. Secondary ocellars hardly differentiated from surrounding hairs; facial ridge bristles much smaller.
- F. Three intralars; basicosta black.
- G. Bucca red.....*coloradensis* Hough
- GG. Bucca black.....*viridescens* Desv.
- FF. Two intralars.
- G. Basicosta yellowish; bucca reddish,
erythrocephala Meigen
- GG. Basicosta black; bucca black.
- H. Head as high as broad; parafacials normally black.....*morticia* n. sp.

HH. Head broader than high; lower half
of parafacials reddish,

vomitória Linne

I. Beard reddish. *vomitória vomitória*

II. Beard black,

vomitória nigribarba n. var.

Steringomyia Pok.

Steringomyia Pokoray, Verh. Zool. Bot. Ges. Wein. xxxix, 568,
1889. Genotype *stylifera* Pok.

Acrophaga Brauer & Bergenstamm, Zweifl. Kais. Mus., v, 1891,
367 (*Steringomyia* and *Acrophaga*). Genotype *alpina* Zett.

The male of the *Steringomyia* genotype, *stylifera* Pok., has an elongate, nude projection on the abdominal venter immediately cephalad of the cleft segment. This single, secondary sexual character does not justify the retention of a genus for this species alone, therefore, acting on Aldrich's advice, the closely allied group *Acrophaga* is included in it.

Steringomyia alpina Zetterstedt.

Sarcophaga alpina Zett. Ins. Lapp., 651, Dipt. Scand. iv, 1304,
N. Europe.

Acrophaga alpina (Zett.) B. & B.

Cynomyia alpina Gerstaecker, Die Zweite deutsche Nordpolfahrt,
etc. East Greenland.

The specimen described below was compared with a European specimen of *alpina* and considered conspecific by the writer.

Male.—Differs from *S. aldrichia* as follows: Front at narrowest width broader than parafacial; lower two-thirds of parafacials bright orange, facial plate dull orange; silvery pruinosity of head much more pronounced; arista plumose only one-half its length; face noticeably more projecting; no bristle beyond middle on inner surface of middle tibia (very prominent in *aldrichia*). Second segment of hypopygium much longer than broad (globose in *aldrichia*); inner forceps much longer than outer (vice versa in *aldrichia*) pointed; outer ones curved apically, pointed, provided with short stiff hairs. Squamae whitish. Length 10 mm.

One male, Tennessee Pass, Colorado, 10,240 feet altitude.
J. M. Aldrich, collector.

***Steringomyia aldrichia*, new species.**

Male.—Head subtriangular, slightly higher than broad; front at narrowest width narrower than parafacial; head black, parafrontals and upper half of parafacials black with silvery pruinosity; basal half of third antennal joint reddish; rest of antennae black; arista longer than antenna, plumose more than two-thirds its length; bucca black with rather stiff black hairs. Mesonotum bluish black marked with dull pruinose stripes. Abdomen steel blue, with silvery pruinosity; long bristles on latero-posterior margins of all segments and long bristles extending across posterior margins of second and third segments; disc of fourth tergite with scattered long bristles and scattered short stiff hairs. Squamae darkened; wings slightly infuscated. Inner forceps shorter than outer; outer ones thin, blade-like, pointed, provided with dense short stiff hairs on inner margin and shorter and sparser ones on outer margin; hypopygium globose.

Female.—Front a little longer than broad; a secondary pair of weak ocellars directly behind hind ocelli. Three pairs well developed marginal scutellars, one pair discal scutellars; abdomen less hairy than in male. Length 7–10 mm.

Six males and two females, Tennessee Pass, Colorado, 10,240 feet altitude, J. M. Aldrich, collector; one male, Seward, Alaska, July 24, 1921, J. M. Aldrich; one male, London Hill Mine, Bear Lake, 7,000 feet altitude, British Columbia, R. P. Currie, collector.

Type.—Male, allotype, female, U. S. N. M., Cat. No. 26163.

The two last specimens mentioned show some slight variation but it is thought not to be sufficient for specific diagnosis.

One female shows an early stage larva protruding from the ovipositor; hence it is assumed the species is viviparous.

***Steringomyia alaskensis*, new species.**

Male.—Differs from *S. aldrichia* as follows: Parafrontals touching just below ocellar triangle; head bristles smaller and weaker; arista somewhat shorter, aristal rays noticeably longer;

abdominal bristles weaker and fewer; inner forceps very broad basally, gradually tapering to points, flattened on posterior aspect, as long as outer, densely clothed with very short stiff hairs; outer forceps blade-like, pointed, densely clothed with short stiff hairs.

Fcmale.—One specimen from Alaska which may prove conspecific with *alaskensis* differs from *aldrichia* by its broader (quadrate) front, weaker head bristles; lowermost fronto-orbital on level with sixth frontal bristle; weaker abdominal bristles with which longer hairs are intermixed. Length 7.5 mm.

One male, Seward, Alaska, July 26, 1921, J. M. Aldrich, collector; one female, Saldovia, Alaska, July 2, 1899, T. Kincaid, collector (Harriman Expedition). The male shows two very weak anterior sublateral bristles, the absence of which is considered one of the chief generic characters for *Steringomyia*; although the female tentatively placed with the male has them absent.

Type.—Male, U. S. N. M., Cat. No. 26164.

***Steringomyia popoffana* Townsend.**

Originally described as *Calliphora popoffana*, Muscoid Flies, Smithsonian Misc. Collections, li, 1908; later placed in *Cynomyiopsis* Townsend, Ins. Ins. Mens., iii, p. 108, 1915.

Only one specimen, female, definitely known, chiefly characterized by short plumosity of arista. Popoff Island, Alaska; perhaps also from Bear Lake, British Columbia.

***Onesia* R.-D.**

Onesia Robineau-Desvoidy, Myiodaires, 365, 1830. Genotype '*sepulcralis* Meigen.

***Onesia agilis* Meigen.**

Male.—Head noticeably higher than broad, black, except for dark reddish brown area between bucca and vibrissae; front very elongate, parafacial distinctly broader than narrowest width of front; antennae entirely black, third joint but little more than one-half the length of arista, slender; parafacials well clothed with hairs halfway to oral margin; bucca swollen, clothed with stiff black hairs.

Two prominent anterior acrosticals; three sublaterals; three intralars. One (normally) bristle on exterior surface beyond middle of fore tibia; one prominent bristle beyond middle of inner surface of middle tibia; one prominent sub-basal bristle on inner surface of post basitarsus. Abdomen metallic greenish blue with tessellate pruinosity. Forceps rather small, nearly bare, the inner ones a little more deeply inset than outer, which tend to enclose inner; outer ones obtusely pointed; hypopygium globose. Wings slightly infuscated basally; squamae white with pale cilia on outside hinge of upper and lower squamae and black hairs on disc of lower squama.

Female.—Frontal vitta over twice as long as broad; lowermost fronto-orbital bristle on level with seventh frontal. Mesonotum with more pruinosity than in male; abdomen distinctly greenish.

A series of four males and three females reared from earth collected in pasture at Riverton, New Jersey, June 10 to August 15, 1921 and 1922, T. H. Frison, collector.

Onesia aculeata Pand.

Male.—Head a little higher than broad; narrowest width of front about one-half width of parafacial; parafrontals, parafacials and bucca faintly silvery pruinose; three sublaterals; one outer bristle beyond middle on front tibia; abdomen metallic green with silvery pruinescence; wings and squamae somewhat smoky; apical cross vein slightly curved. Hypopygium small, globose; forceps unusually small, the outer ones just equal to the width of the inner ones at their base, obtuse; inner ones slender, sharply pointed.

One specimen, Melrose Highlands, Massachusetts, September 13, 1914, on goldenrod (C. H. T. Townsend).

Cynomyia R.-D.

Cynomyia Robineau-Desvoidy, *Myiodaires*, 363, 1830. Genotype, *mortuorum* Linné; Hough, Ent. News, x, 64, 1899, definition and list of North American species, Zool. Bull., ii, 285, 1899, notes.

Carcinomyia Townsend, type *hirta* Hough, Proc. Biol. Soc. Wash., xviii, 21, 1915. Townsend makes this synonym of *Cynomyia*, Ins. Ins. Mens., iii, 117.

Cynomyopsis Townsend, type *cadaverina* Desv., Ins. Ins. Mens., iii, 118 (Aldrich).

Cynomyia mortuorum Linné, Fauna Suec. 2nd ed., no. 1830, p. 452. Europe.

A holarctic species occurring along seacoasts and believed to breed mainly in dead fish. *Cynomyia hirta* Hough appears to be merely a hairy form of *mortuorum* (Aldrich).

Cynomyia cadaverina Robineau-Desvoidy, Myiodaires, 365.

Cynomyiopsis Townsend, genotype *cadaverina*, Ins. Ins. Mens., iii, 118.

Calliphora texensis Townsend, Muscoid Flies, 116, 1908.

A holarctic species; appears in warmer parts of country just after the heat of the summer has passed.

Calliphora R.-D.

Synonyms: *Composomyia* Rondani, 1875; *Eucalliphora* Townsend, 1908 (type *latifrons*, North America).

Calliphora Robineau-Desvoidy, Essai Myiodaires, p. 430, 1830. Type, *Musca erythrocephala* Meigen, by original designation (as *vomitória* Linné)

In spite of the abundance of individuals and fewness of species belonging to *Calliphora* (sensu stricto) well known as blue-bottle or blow-flies, they have proved one of the worst groups for the systematist and many misidentifications are extant. Some of the main characters used are unreliable, while others, which were believed variable, prove to be more stable than supposed. It is hoped that the characters here used, both genetical and external, will clear up some of the mooted points.

Calliphora vomitoria Linné, Fauna Suec., 2nd ed., no. 1830, p. 452 (*Musca*).

North American synonyms: *Calliphora fulvibaris* Desv.; *C. nigribucca* Hough, a nomen nudum (from the name it appears that the specimen, or specimens, were the black bearded form of *vomitória*); *C. rubrifrons* Townsend; *C. irazuana* Townsend, a varietal form.

C. vomitoria is the most robust of the *Calliphora*. Its general color is also darker while the amount of silvery pruinosity on the abdomen is very slight. It has been chiefly characterized by the red beard but the writer has seen black bearded forms from widely scattered parts of North America. The species is apparently holarctic in distribution.

***C. vomitoria nigribarba*, new variety.**

Differs from *vomitoria* only by having the beard black instead of red. This form is usually associated with *C. viridescens* in collections. There are at hand specimens from Narrows, Mt. Desert, Maine; South West Harbor, Maine; Whiteface Mountains and Mount Marcy, Adirondacks, New York; Kulak Bay, Alaska; Moores Lake, Idaho; Fallen Leaf, California.

***C. vomitoria irazuana* Townsend, Muscoid Flies, 1908, 118.**

This form described as a distinct species is a dark bearded form of *vomitoria* which has the wing bases unusually darkened. (Aldrich synonymy, on basis of male genitalia.)

***Calliphora elongata* Hough (Snn.).**

Cynomyia elongata Hough, Ent. News, ix, 106.

Cynomyiopsis elongata Townsend.

This species apparently is a rare one and as far as known has been collected but twice since the original series were described in 1899. Dr. J. M. Aldrich took several specimens, males and females, in South Dakota, and Dr. W. M. Wheeler captured specimens in Wyoming. The National Collection has a cotype male and female, taken in copula; a cotype male and female are in the Hough Collection at the Field Museum, Chicago; while Aldrich has seen in the Kansas collection four males from Creede, Colorado, in poor condition but with forceps spread.

***Calliphora morticia*, new species.**

Differs chiefly from *viridescens* in having the head as high as broad (broader than high in *viridescens*); head except eyes entirely black, parafrontals and parafacials provided with sil-

very pruinosity (two females probably teneral have a reddish spot above antennae and the face partly reddish). The forceps of the male differ from those of *viridescens* in being more elongate and gradually coming to rather a blunt point and instead of having long sparse hairs are provided with dense short stiff hairs below and still shorter hairs above. The apex of the forceps of *viridescens* takes a sudden curve and becomes sharply pointed. The species is somewhat smaller and more slender than the average *viridescens* and the mesonotum is less pruinose.

One male and two females, Kadiak, Alaska, July 20, 1899, T. Kincaid, collector (Harriman Expedition); three females, Alaska.

U. S. N. M. Acc. 18491. Type, male; allotype, female, U. S. N. M. Type. Cat. No. 26162.

Calliphora viridescens Robineau-Desvoidy, Myiodaires, 437, Carolina.

This species appears to be the least common of the *Calliphora* species. Only five authentic males have been seen by the writer. Specimens at hand are from Melrose Highlands, Massachusetts; Ithaca, New York; Plummer's Island, Maryland; Columbus, Ohio; St. Louis, Missouri; Georgia; Lowe's Inlet, British Columbia; Lafayette, Indiana; Moscow, Idaho; Stratford, Washington; Harvey's Ranch, New Mexico, 10,000 feet.

Aldrich has ascertained through Villeneuve that the so-called synonym *violacca* Meigen of this species is in reality *Phormia regina*. Dr. Villeneuve examined one of our North American spread males and reports the species distinct from any at present known in Europe.

Calliphora latifrons Hough, Zool. Bull., ii, 286, Washington, Idaho, California, Mexico.

Townsend makes this species type of *Eucalliphora*, basing it on insufficient characters, hence genus not accepted (Aldrich and Shannon).

A common species found in the west in British Columbia and southward into Mexico.

Calliphora erythrocephala Meigen, Syst. Besch., v, 62
(*Musca*), Europe.

The distinct yellow to orange color of the basicosta in this species in contrast to the black basicosta in the others serves for immediate identification of this species.

Distribution: Reported from all parts of the United States.

Calliphora coloradensis Hough, Zool. Bull., ii, 286, Colorado.

Walton, Proc. U. S. Nat. Mus., xlviii, 175, says is common in prairie-dog town, flying into burrows. One female in collection shows early stage larva protruding from ovipositor.

Distribution: Western United States. Apparently coextensive with *C. latifrons*.

NOTES ON AMERICAN CULEX

(*Diptera, Culicidae*)

By HARRISON G. DYAR

Culex (Choeroporpa) mutator Dyar & Knab.

Culex mutator Dyar & Knab, Jour. N. Y. Ent. Soc., xiv, 216, 1906.

Culex mutator Dyar, Proc. Ent. Soc. Wash., viii, 17, 1906.

Culex mutator Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., ii, 108, fig. 361, 1912.

Culex mutator Howard, Dyar & Knab (in part, larva only), Mosq. No. & Cent. Am. & W. I., iii, 422, 1915.

Culex (Choeroporpa) mutator Dyar (in part, larva only), Ins. Ins. Mens., viii, 66, 1920.

Culex (Choeroporpa) alfaroi Dyar, Ins. Ins. Mens., ix, 34, 1921.

Culex mutator was described from larvae taken in Mexico by the late Frederick Knab. In writing up the account of the adults for the monograph, it never occurred to us that the original culture might have been mixed, but such now proves to be the case. In commenting on the structure of the male hypopygium (Dyar, 1920), I could not distinguish the species from *leprincci* by any reliable characters, yet supposed that the forms must be distinct on account of the obvious larval differ-

EXPLANATION OF PLATES

PLATE VI

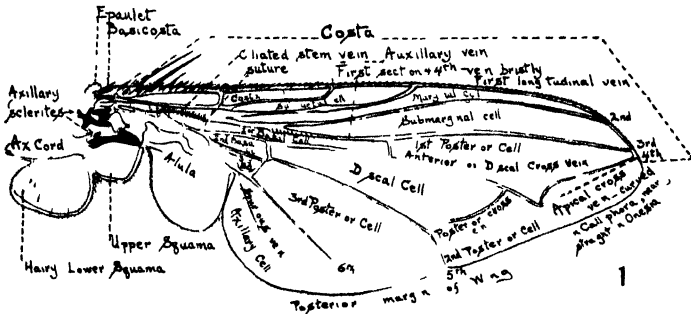
1. A composite wing of Calliphoridae showing characters of several genera.
2. Mesonotum of *Calliphora vomitoria* Linne
- 3a Lateral view of hypopygium of *Calliphora vomitoria* Linne.
- 3b Post aspect of second hypopygial segment and forceps.

PLATE VII

- 4a. Post aspect of second hypopygial segment and forceps of *Cynomyia mortuorum* Linne.
- 4b. Lateral view of hypopygium.
- 5a. Post aspect of second hypopygial segment of *Calliphora elongata* Hough.
- 5b. Lateral view of hypopygium.
- 6a Post aspect of hypopygium of *Cynomyia cadaverina* Desv.
- 7a Lateral view of hypopygium in unsprad condition of *Steringomyia stylifera* Pok
- 7b Post aspect of second hypopygial segment and forceps.
- 7c Lateral aspect of hypopygium
- 8a. Post aspect of second hypopygium and forceps.
- 8b. Lateral aspect of hypopygium.

PLATE VIII

- 9a. Lateral aspect of penis and accessory structures of *Calliphora erythrocephala* Mg.
- 9b Post aspect of second hypopygial segment and forceps
- 10a Post aspect of hypopygium and forceps.
- 10b Lateral aspect of hypopygium
- 11 Lateral view of hypopygium and forceps of *Calliphora viridescens* Desv.
- 12a. Post aspect of hypopygium and forceps.
- 12b. Lateral view of penis.
- 13a. Post aspect of hypopygium of *Onesia agilis* Mg
- 13b Lateral aspect of penis.
- 14a Lateral view of hypopygium and outer forcep of *Calliphora morticia* Snn.
- 14b. Post aspect of forceps.
15. Lateral view of hypopygium of *Onesia aculeata* Pan.
- 16a. Post aspect of hypopygium and forceps of *Steringomyia aldrichia* Snn.
- 16b. Lateral view of hypopygium.
17. Lateral view of hypopygium of *Steringomyia alpina* Zett

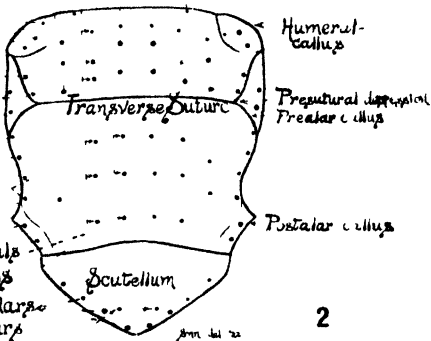
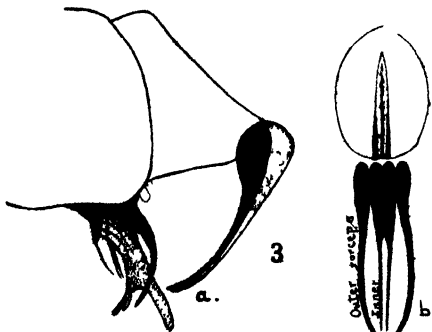


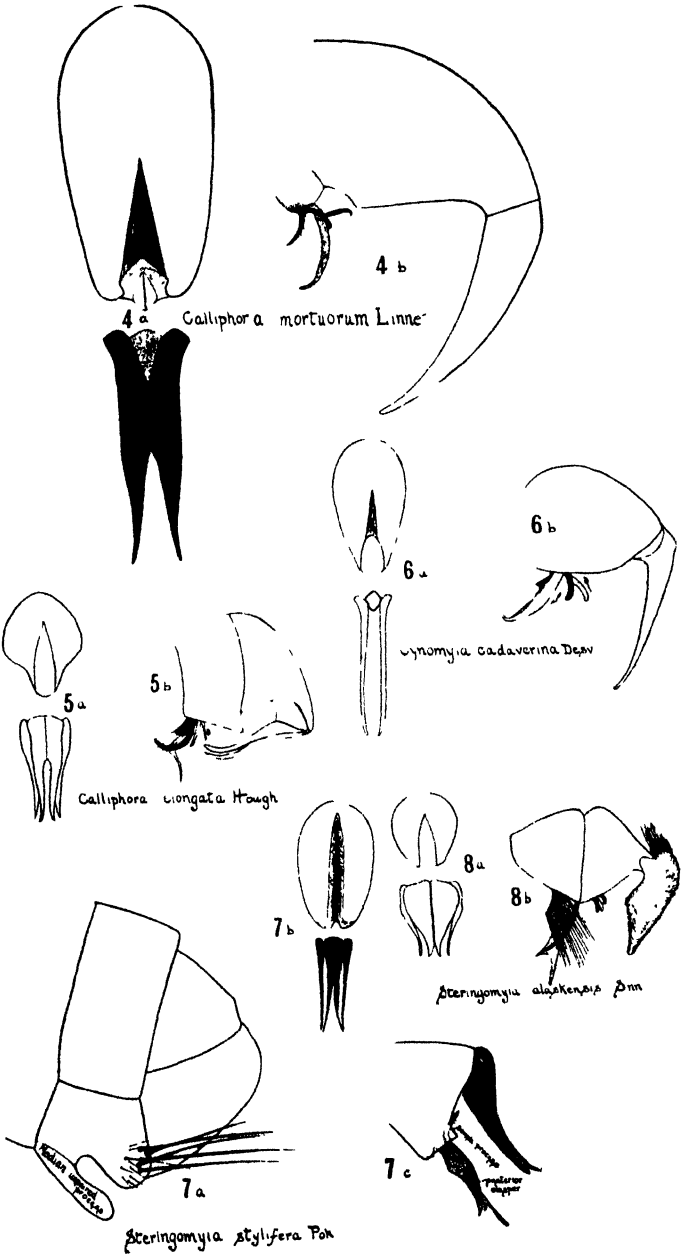
A Composite Wing of Calliphoridae Showing Characters of Various Genera

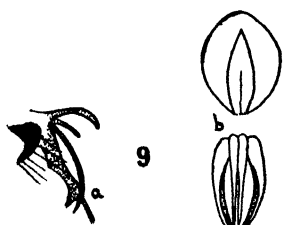
Sublateral row -
 Anterior dorsocentrals - Proseta -
 Anterior acrosticals -
 Humeral -

Posthumeral
 Preputural
 Notopleural
 Supra-alar row -

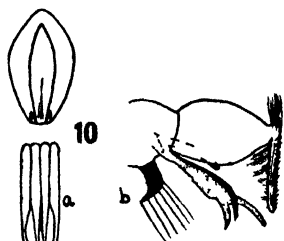
Intra-alar
 Post alar
 Postdorsocentrals
 Postacrosticals
 Marginal scutellars
 Discal scutellars

Mesonotum of *Calliphora vomitoria* Linne*Calliphora vomitoria* Linne

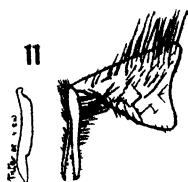




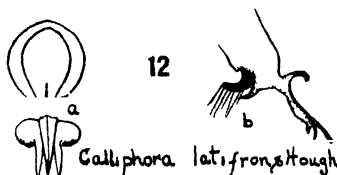
Calliphora erythrocephala Mg



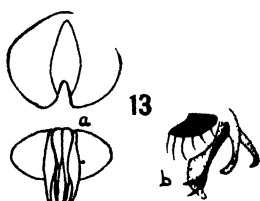
Calliphora coloradensis Hough



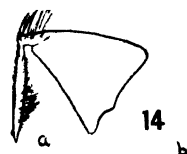
Calliphora (viridescens)



Calliphora latifrons Hough



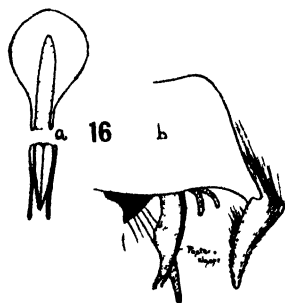
Onezia agilis Meigen



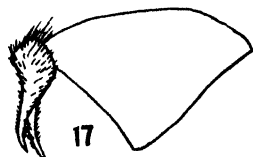
Calliphora morticia Sm.



Onezia aculeata Pan



Steringomyia aldrichia Sm



Steringomyia alpina Zett.

ences. The bred series is short, five adults and two larval skins, only one of which is represented by an adult. Careful restudy of these shows that two of the specimens are *leprincei*, including the mounted male, while three are the true *mutator*, one a male, and being the species later described by me as *alfaroi* from the male structures and without a larva.

Culex (Choeroporpa) leprincei Dyar & Knab.

- Culex atratus* Theobald (in part), Mon. Culic., ii, 55, 1901.
Culex atratus Giles (in part), Gnats or Mosq., 2 ed., 459, 1902.
Melanoconion atratus Theobald (in part), Mon. Culic., iii, 238, 1903.
Culex atratus Blanchard (in part), Les. Moust., 335, 1906.
Culex leprincei Dyar & Knab., Journ. N. Y. Ent. Soc., xv, 202, 1907.
Culex egberti Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 214, 1907.
Culex leprincei, Busck, Smith. Misc. Coll., Quart. Iss., lii, 67, 1908.
Melanoconion atratum Peryassú (not Theobald), Os. Culic. do Braz., 50, 242, 1908.
Culex trachycampa Dyar & Knab., Can. Ent., xli, 101, 1909.
Melanoconion atratus Theobald (in part), Mon. Culic., v, 456, 1910.
Melanoconion atratum Surcouf & Gonzales Rincones (not Theobald), Essai Dipt. Vul. Venez., 208, 1911.
Culex mutator Howard, Dyar & Knab (not Dyar & Knab), Mosq. No. & Cent. Am. & W. I., ii, plate 10, fig. 68, 1912.
Culex trachycampa Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iii, 329, 1915.
Culex leprincei Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iii, 397, 1915.
Culex mutator Howard, Dyar & Knab (in part), Mosq. No. & Cent. Am. & W. I., iii, 422, 1915.
Culex (Mochlostyrax) peribleptus Dyar & Knab, Ins. Ins. Mens., v, 181, 1917.
?Culex (Mochlostyrax) pose Dyar & Knab, Ins. Ins. Mens., v, 182, 1917.
Culex (Choeroporpa) leprincei Dyar, Ins. Ins. Mens., vi, 105, 1918.
Culex (Choeroporpa) mutator Dyar (not Dyar & Knab), Ins. Ins. Mens., vi, 105, 1918.
Culex (Mochlostyrax) peribleptus Dyar, Ins. Ins. Mens., vi, 108, 1918.
Culex (Mochlostyrax) moorei Dyar, Ins. Ins. Mens., vi, 108, 1918.
Culex (Choeroporpa) peribleptus Dyar, Ins. Ins. Mens., vii, 161, 1919.

Culex (Choeroporpa) mutator, *leprincei*, *peribleptus* and *moorei* Dyar, Ins. Ins. Mens., viii, 66-68, 1920.

Culex (Choeroporpa) degustator Dyar, Ins. Ins. Mens., ix, 39, 1921.

Culex (Choeroporpa) pose Dyar (?not Dyar & Knab), Ins. Ins. Mens., x, 93, 1922.

Culex (Choeroporpa) ?pose, *egberti* and *degustator* Dyar, Proc. U. S. Nat. Mus., lxii, 11-13, 1922.

Culex (Choeroporpa) borinqueni Root, Amer. Journ. Hyg., ii, 400, 1922.

I have recently become convinced that we have here to do with a single species of wide distribution—Brazil to the southern United States and probably the Antilles. Formerly it seemed necessary to apply different names to the forms of separate localities, and the apparent intervention of a species in Mexico having the same genitalia but different larvae (*mutator* D. & K.) lent weight to this view. The previous discussion clears up that matter and paves the way for a broader distribution. As the males and larvae are alike throughout, or at least as far as known, I think this may be accepted. Theobald and the earlier authors confused this species with *atratus* Theob., a species confined to the Antilles and having very different males and larvae, although similar coloration. I am not yet certain of the synonymy of *pose* D. & K. It is true that I identified males from Louisiana as that species (Dyar, 1922), but a long series from Mr. Bradley shows the gold of the mesonotum gradually fading out. I await Texas material before deciding positively as to *pose*.

In several keys and descriptions I have given the spine of the mesosomal plate of the male hypopygium as being subapical. The appearance changes with the position of the mount; but *leprincei* should be described as medial on the stem. Only in *mutator* (*alfaroi*) is the spine really subapical.

***Culex (Melanoconion) panocossa*, new species.**

The Panama representative of *Culex (Melanoconion) aikenii* Aiken (= *Gonphodeomyia inornata* Theob. = *Culex ocossa* D. & K.) of British Guiana and Surinam; but the dif-

ferences appear to be specific rather than racial. In the male hypopygium the side-piece at tip has on the outside a dense tuft of curved hairs; subapical seta on the inner side is a true seta, stout, but not flattened; the stem of the outer division of the lobe, and that of the inner division also, are much longer, the latter being distinctly longer than its appendages, whereas in *aikenii* the reverse is the case.

Nineteen specimens of both sexes, Bas Obispo, Canal Zone, Panama, bred from larvae among the roots of *Pistia*, February, 1923 (J. B. Shropshire).

MOSQUITOES DESCRIBED BY VON HUMBOLDT

(*Diptera, Culicidae*)

By HARRISON G. DYAR

Dr. C. Bonne and the writer endeavored to fix the identity of the five species of *Culex* described by von Humboldt in 1820. The descriptions occur in the work by Humboldt and Bonpland; but it is stated that Humboldt himself made the descriptions from specimens in the field, which he apparently did not take the trouble to bring home. Mosquitoes were captured in large numbers, he tells us, and it would appear that these were spread before him, and the conspicuous and brilliant ones selected for description, and then the mass discarded. The descriptions were evidently made with the naked eye or a very weak lens, from the material lying on a cloth or paper without lifting the wings, so that abdominal spots could not be distinguished from bands. Dr. Bonne objected to some of my suggestions on the ground that the species described are rare ones, whereas he supposed that von Humboldt would describe the common ones only. My opinion is different, namely, that a great number of specimens were taken in a rich and abundant locality and season, from which the conspicuous ones were selected. In such a fortunate catch, doubtless the whole fauna was represented, so that the question of rarity need not trouble us. With

these considerations in mind, I make the following identifications:

Culex cyanopennis von Humboldt is *Psorophora tibialis* R.-D.

Culex lineatus von Humboldt is *Psorophora saeva* D. & K.

Culex ferox von Humboldt (1820) is *Psorophora posticatus* Wied. (1821).

Culex chloropterus von Humboldt is *Sabethoides nitidus* Theob.

Culex maculatus von Humboldt (1820) is homonymous with *C. maculatus* Meigen (1804). The description cannot apply to any mosquito, and in any case the name falls as a homonym.

A NEW SABETHES FROM SURINAM

(*Diptera, Culicidae*)

By C. BONNE

Sabethes kappleri, new species.

Female: Proboscis rather short, swollen at tip, dark blue. Palpi about one-fourth of the proboscis, blue-black. Clypeus rounded, dark, white pruinose. Occiput clothed with iridescent greenish blue flat scales.

Prothoracic lobes collar like, iridescent blue. Mesonotum covered with elliptical, flat, greenish blue iridescent scales. Scutellum with similar coloration. Postnotum with four setae on posterior part and some greenish scales. Coxae and pleurae with patches of silvery scales.

Abdomen compressed, truncate at tip, dark dorsally, white beneath, the colors separated in a straight line.

Wings narrow, smoky; petiole of second marginal cell less than half as long as its cell, that of second posterior cell longer than half its cell. Basal cross vein about its own length from anterior cross vein. Scales of veins elliptical, some of them truncate. Halteres blackish.

Front legs: Femora blue, white beneath on basal fourth, tibiae blue with outstanding blue scales on distal half, forming a small paddle, first two tarsi blue, last three tarsi white, with a dark shade on one side.

Mid legs: Distal half of tibiae, all of first and second tarsal joints with large outstanding scales forming a blue and white paddle; scales on tibia and first tarsal blue, second, third and basal half of fourth tarsal snowy white, apical half of fourth and whole of fifth tarsal blue.

Hind legs: Femora blue, lighter beneath and white beneath on basal fourth, tibiae and tarsal joints blue but the two last joints white beneath.

Claw formula 0.0-0.0-0.0.

Length: Body about 6 mm.; wing 5 mm.

Differs from *goeldii* H., D. & K. and *schausi* D. & K. by the absence of paddles on the hind legs and also by the absence of white above the paddles on the mid legs. Differs from *tarsopus* D. & K. by the absence of white above the paddles of the mid legs and the extension of the white on the front legs.

Only one specimen was captured, in the woods attacking in daytime; February, 1923, Moengo, Surinam. Already when flying it was easily recognized as different from *bipartipes* D. & K., the common *Sabethes* with white on the mid legs at Moengo. Unfortunately I did not have anything to catch it with, so I had to crush it and damage it considerably. It will be deposited in the Museum of the Institute for Tropical Hygiene, Amsterdam, Holland.

A LIST OF MOSQUITOES FROM DUTCH GUIANA

(Diptera, Culicidae)

By J. BONNE-WEPISTER AND C. BONNE

The following mosquitoes have been found by us in Dutch Guiana:

Sabethes goeldii Dyar & Knab.

Sabethes schausi D. & K.

- Sabethes bipartipes* D. & K.
Sabethes cyaneus Fabricius.
 **Sabethes kappleri* Bonne.
Sabethes albiprivus Lutz.
Sabethoides imperfectus Bonne-Wepster & Bonne.
Sabethoides nitidus Theobald.
Wyeomyia (*Triamyia*) *aporonoma* D. & K.
Wyeomyia (*Dendromyia*) *agnostips* D. & K.
 **Wyeomyia* (*Dendromyia*) *roucouyana* B.-W. & B.
Wyeomyia (*Wyeomyia*) *oblita* L.
Wyeomyia (*Wyeomyia*) *telestica* D. & K.
 **Wyeomyia* (*Cleobonnea*) *occulta* B.-W. & B.
 **Wyeomyia* (*Cleobonnea*) *argenteorostris* B.-W. & B.
Limatus durhami Theo.
Limatus paraensis Theo.
Limatus (*Lemmamyia*) *asullepta* Theo.
 **Limatus* (*Lemmamyia*) *pseudomethysticus* B.-W. & B.
Wyeomyia (*Decamyia*) *onidus* D. & K.
Wyeomyia (*Decamyia*) *pseudopecten* D. & K.
Wyeomyia (*Decamyia*) *eloisa* D. & K.
Wyeomyia (*Calladimyia*) *melanocephala* D. & K.
 **Wyeomyia* (*Menolepis*) *albosquamata* B.-W. & B.
Wyeomyia (*Dodecamyia*) *clasoleuca* D. & K.
Wyeomyia (*Dodecamyia*) *aphobema* Dyar.
Wyeomyia (*Dodecamyia*) *splendida* B.-W. & B.
 **Wyeomyia* (*Hystatomyia*) *lamellata* B.-W. & B.
Wyeomyia (*Prosopolepis*) *flui* B.-W. & B.
Goeldia trichopus Dyar.
Goeldia frontosa Theo.
Goeldia dicellaphora D. & K.
Goeldia longipes Fabr.
Joblotia digitatus Rondani.
Deinocerites troglodytus D. & K.
Culex (*Lutzia*) *allostigma* H., D. & K.
Culex (*Carrollia*) *urichii* Coquillet.
 **Culex* (*Carrollia*) *bonnei* Dyar.

- **Culex* (*Carrollia*) *infoliata* B.-W. & B.
- Culex* (*Culex*) *factor* D. & K.
- Culex* (*Culex*) *corniger* Theo.
- Culex* (*Culex*) *mollis* D. & K.
- Culex* (*Culex*) *declarator* D. & K.
- Culex* (*Culex*) *quinquefasciatus* Say.
- Culex* (*Culex*) *coronator* D. & K.
- **Culex* (*Culex*) *surinamensis* Dyar.
- **Culex* (*Culex*) *brevispinosus* B.-W. & B.
- **Culex* (*Culex*) *bonneae*, D. & K.
- Culex* (*Microculex*) *pleuristriatus* Theo.
- **Culex* (*Microculex*) *chryselatus* D. & K.
- Culex* (*Microculex*) *inimitabilis* D. & K.
- Culex* (*Microculex*) *imitator* Theo.
- Culex* (*Microculex*) *ocellatus* Theo.
- Culex* (*Aedmus*) *conservator* D. & K.
- **Culex* (*Choeroporpa*) *nicceriensis* B.-W. & B.
- **Culex* (*Choeroporpa*) *alcocci* B.-W. & B.
- Culex* (*Choeroporpa*) *chrysonotum* D. & K.
- Culex* (*Choeroporpa*) *taeniopus* D. & K.
- **Culex* (*Choeroporpa*) *albinensis* B.-W. & B.
- **Culex* (*Choeroporpa*) *coppenamensis* B.-W. & B.
- Culex* (*Choeroporpa*) *bastagarius* D. & K.
- **Culex* (*Choeroporpa*) *maroniensis* B.-W. & B.
- **Culex* (*Choeroporpa*) *saramaccensis* B.-W. & B.
- **Culex* (*Choeroporpa*) *terebor* Dyar.
- **Culex* (*Choeroporpa*) *ybarmis* Dyar.
- **Culex* (*Choeroporpa*) *phlogistus* Dyar.
- **Culex* (*Choeroporpa*) *phlabistus* Dyar.
- **Culex* (*Choeroporpa*) *corentynensis* Dyar.
- **Culex* (*Choeroporpa*) *vapulans* Dyar.
- **Culex* (*Choeroporpa*) *communitor* Dyar.
- **Culex* (*Choeroporpa*) *eastor* Dyar.
- **Culex* (*Choeroporpa*) *maxinocca* Dyar.
- **Culex* (*Choeroporpa*) *tosimus* Dyar.
- Culex* (*Choeroporpa*) *educator* D. & K. (*vaxus* Dyar).

- **Culex* (*Choeroporpa*) *bibulus* Dyar.
- **Culex* (*Choeroporpa*) *jonistes* Dyar.
- **Culex* (*Choeroporpa*) *idottus* Dyar.
- **Culex* (*Choeroporpa*) *xivylis* Dyar.
- Culex* (*Melanoconion*) *spissipes* Theo.
- **Culex* (*Melanoconion*) *commeynensis* B.-W. & B.
- **Culex* (*Melanoconion*) *ensiformis* B.-W. & B.¹
- Culex* (*Melanoconion*) *aikenii* Aik. (*ocossa* D. & K.).
- **Culex* (*Mochlostyrax*) *curopinensis* B.-W. & B.
- **Culex* (*Mochlostyrax*) *alogistus* B.-W. & B.
- **Culex* (*Mochlostyrax*) *multispinosus* B.-W. & B.
- **Culex* (*Eubonnea*) *tapena* Dyar.
- Taeniorhynchus* (*Taeniorhynchus*) *titillans* Walker.
- Taeniorhynchus* (*Taeniorhynchus*) *titillans* var. *flaveolus* Coq.
- Taeniorhynchus* (*Taeniorhynchus*) *humeralis* D. & K.
- Taeniorhynchus* (*Taeniorhynchus*) *pseudotitillans* Theo.
- Taeniorhynchus* (*Coquillettidia*) *fasciolatus* Arr.
- Taeniorhynchus* (*Coquillettidia*) *arribalzagae* Theo.
- Psorophora* *saeva* D. & K.
- Psorophora* *cilipes* Fabr.
- Psorophora* *posticatus* Wied.
- Psorophora* *lutzi*. Th.
- Psorophora* *cingulatus* Fabr.
- Aedes* (*Stegomyia*) *aegypti* Linnaeus.
- Aedes* (*Culicelsa*) *taeniorhynchus* Wied.
- Aedes* (*Culicelsa*) *fluvialis* Lutz.
- Aedes* (*Ochlerotatus*) *fulvus* Wied.
- Aedes* (*Ochlerotatus*) *nubilus* Theo.
- Aedes* (*Ochlerotatus*) *scapularis* Rondani.
- **Aedes* (*Ochlerotatus*) *eucephaleus* Dyar.
- Aedes* (*Ochlerotatus*) *serratus* Theo.
- Aedes* (*Ochlerotatus*) *hortator* D. & K.
- **Aedes* (*Howardina*) *arborealis* B.-W. & B.
- Aedes* (*Howardina*) *fulvithorax* Lutz.
- Aedes* (*Finlaya*) *terrens* Walker.

¹ Perhaps not specifically distinct from *dunni* Dyar—H. G. Dyar.

- **Aedes (Finlaya) argyrothorax* B.-W. & B.
Haemagogus (Stegoconops) capricornii Lutz.
Uranotaenia lowii Theo.
Uranotaenia leucoptera Theo.
Uranotaenia geometrica Theo.
Uranotaenia rowlandi Theo.
Uranotaenia pulcherrima Theo.
Uranotaenia pallidiventer Theo.
Megarhinus trinidadensis D. & K.
 **Megarhinus moengoensis* B.-W. & B.
 **Megarhinus guadeloupensis* var. *guianensis* B.-W. & B.
Megarhinus haemorrhoidalis Fabr.
 **Megarhinus aldrichanus* B.-W. & B.
Aedeomyia squamipennis Arr.
Orthopodomyia fascipes Coq.
Anopheles (Anopheles) nimba Theo.
Anopheles (Anopheles) hylephilus D. & K.
Anopheles (Anopheles) peryassui D. & K.
Anopheles (Anopheles) eiseni Coq.
Anopheles (Anopheles) tarsimaculata Goeldi.
Anopheles (Anopheles) argyritarsis Rob.-Desv.
Anopheles (Anopheles) apicimacula D. & K.
Anopheles (Anopheles) mediopunctatus Theo.
Anopheles (Anopheles) intermedius Chagas.
Anopheles (Anopheles) pseudomaculipes Theo.
Anopheles (Chagasia) farjardi Lutz.

Altogether 135 species. The species marked with an * are ' known only from Surinam, 46 species altogether.

VARIABILITY OF ANOPHELES TARSIMACULATA GOELDI

(Diptera, Culicidae)

By C. BONNE

Howard, Dyar and Knab report considerable variation in the extension of the black spots on the costa of the wing. I can

confirm this from material collected in Surinam, which also shows variation in the extension of the white on the hind legs. Howard, Dyar and Knab describe this species with the white on the hind legs on the apical half of the second joint, all of the third and fourth joints and the apical half of the fifth joint. Panama specimens show the white accordingly. In Surinam the white is usually more extensive and present on the apical four-fifths of the second joint; the other joints show no differences. Specimens with only the apical half of the second joint of the hind legs white are occasionally seen also, but much rarer, and much rarer still are intermediate forms with the white on the distal two-thirds.

There seem to be certain differences in life habits between *tarsimaculata* from different places and it may be worth while to pay attention to the small differences in coloration. In the Canal Zone *tarsimaculata* and *albimanus* are caught in houses in large numbers. At Moengo in the interior of Surinam *tarsimaculata* is practically never caught in houses although it breeds extensively at Moengo; *argyritarsis* has taken its place. *Tarsimaculata* can be found always in cowsheds, however, where *argyritarsis* is not so common.

NOTES ON SOME GOELDIA SPECIES FROM SURINAM

(*Diptera, Culicidae*)

By C. BONNE

Goeldia trichopus Dyar.

Male. Palpi two-thirds as long as proboscis.

Hypopygium. Side piece long and slender, about four times as long as wide, conically tapered toward tip; basal lobe large, conically pointed, densely covered with long hairs; a group of closely placed long stiff hairs on each side piece near its base and all over the side piece very long coarse hairs. Clasper moderate, very slender, the base inflated, with terminal ap-

pendage. Tenth sternites prominent, with thickened inner margin and a few strong curved teeth on tip. Lobes of ninth tergite capitate with six long, coarse, terminal spine-like bristles.

One male was captured in a house in Surinam.

Goeldia longipes Fabricius.

Larva. Head rounded, quadrate, longer than wide; mouth-parts not visible from above, though strongly developed and heavily armed. Antennae slender with a single hair at outer third. Head hairs single. Mental plate broadly triangular, more or less divided into three plates, middle plate bearing a stout central spine with two minute spines on each side; lateral plates each with nine teeth, the third and fourth being most prominent. Air tube moderate, flared at base, spicular pilose; a row of densely placed tufts of three or four long very fine hairs along ventral line, running from base to tip, in all about thirty-two tufts. Lateral comb of eighth segment of many sharply pointed spines in a patch. Anal segment about as long as wide with a dorsal plate; dorsal tuft consisting of a group of five and a group of ten long hairs on each side; lateral hair single, long, arising from angle to plate; subventral tufts multiple, long. Anal gills long, at least five times as long as anal segment, tracheae stout.

Dyar recently (Ins. Ins. Mens., vi, 84) made *culicivora* Dyar and Knab a synonym of *longipes*. The larva of *culicivora* has only four spines on the eighth segment; *longipes* has a patch with a large number of spines in three rows. We found the larvae several times in Surinam in the jelly-like mass between the leaf-stalks of *Heliconia* and *Ravenala*, feeding on *Wyeomyia* (*Cleobonnea*) *occulta* B.-W. & B.

ON THE AUTHORSHIP OF CERTAIN NAMES

(*Lepidoptera*, *Phalaenidae*=*Noctuidae*)

By WM. BARNES AND F. H. BENJAMIN

In a recent article by Mr. A. N. Caudell (1922, Ins. Ins. Mens., x, 112), Danby and Green are given credit of authorship of certain names, viz.:

Pleroma apposita, *Xylomiges candida*, *X. cognata*, *X. pulchella*, and "*Taeniocampa*" *ferrigera*; because of the publication of figures in the Bull. N. H. Soc. B. C., 17-18, pl. I, dated 1893. Dr. Smith's descriptions were published in 1894 (Trans. Am. Ent. Soc., XXI, 78 et seq.), except *P. apposita* which was described and figured by Smith in 1892 (Ent. News, III, 252, pl. X).

From the dates printed on the publications, Danby and Green's paper would appear to have had a year's priority.

Mr. E. H. Blackmore furnishes the following data. (1) Proof copy of Danby and Green's paper, dated Jan. 15, 1894, in Mr. Danby's handwriting. (2) No trace of minutes of the B. C. Ent. Soc. exist earlier than 1902. (3) "I have tried the Gov't Printing Office but none of their earlier records are existent." (4) Mr. Green is alive but knows nothing of the publication of this paper.

Librarians at the following libraries were consulted: Nat. Hist. Soc. B. C.; Cornell; U. S. D. A.; U. of I.; Ent. Soc. Ont.; Ont. Agr. Col.; Can. D. A.; Cong.; John Crerar; Phila. Ac. N. S.; Mus. Comp. Zool.; Bost. Soc. N. H.; Brit. Mus.

The earliest date received for the 1893 Bull. N. H. Soc. B. C. is March 26, 1896 (British Museum).

The earliest date received for the Trans. Am. Ent. Soc., XXI, 78, is April 14, 1894 (Cornell University).

Capt. N. D. Riley (British Museum) furnishes the following data.

"Our copy of Trans. Am. Ent. Soc., XXI, PP. 39, 88 was received here 2/5/94. That of Bull. N. H. Soc. Br. Col. on 26/3/96. This later paper is, I see, referred to in the Zool. Record for 1895, and, most unaccountably, one of the papers (Newcombe's Mollusca) got into the record for 1893 yet includes reference to a paper published in the Trans. Ottawa Field Club, in Dec. 1893. I think there can be no doubt however that it was not published in 1893; in fact I should have no hesitation in giving the Am. Ent. Soc. paper priority."

Unless further data regarding an earlier receipt of the Bull.

Nat. Hist. Soc. B. C. be received, Smith's name should be retained as author for the species in question.

AN UNDESCRIBED SPECIES OF PRIONOTA FROM JAVA

(*Diptera, Tipulidae*)

By CHARLES P. ALEXANDER

The following undescribed species of *Prionota* van der Wulp was included in some extensive collections of crane-flies belonging to the Paris Museum and sent to me for determination through the kind interest of Mons. Eugene Séguy. The unique type is in the collection of the Paris Museum.

Prionota séguyi, new species.

General coloration obscure orange, the praescutum with three slightly darker stripes; wings pale brown, the coastal region darker; cell M_1 short-petiolate; basal abdominal tergites not conspicuously brightened.

Female.—Length about 27 mm.; wing, 20–21 mm.

Head black, the genae light gray pruinose. Antennae black, the bases of flagellar segments 1 to 4 indistinctly ferruginous.

Mesonotum obscure orange, the praescutum with three darker, rust-brown stripes, the broad median stripe entire (narrowly divided by a pale vitta in *P. nigriceps* Wulp). Wings weakly tinged with brown, the costal region with dark brown, this darkened area including cells *C*, *Sc*, 1st R_1 , 2nd R_1 and R_2 ; stigma still darker brown; wing-root pale brownish yellow; a brown wash in cell M_1 and another along vein 2nd *A*. Venation: Cell M_1 with a petiole that is approximately equal to *m*; *m-cu* distinct.

Abdominal tergites dark brown, very inconspicuously variegated with ferruginous, the basal segments not conspicuously brighter than the terminal segments; basal sternites ferruginous, margined caudally and laterally with dark brown; terminal sternites uniformly dark.

Habitat.—Java.

Holotype, ♀, Soekaboemi, 1919 (E. Séguy).

This interesting crane-fly is named in honor of Mons. Eugene Séguy.

The genus *Prionota* was erected by van der Wulp (1885) for the supposedly undescribed species, *P. nigriceps* (Java). As has recently been pointed out by Edwards, this species is doubtfully distinct from the *Ctenophora xanthomelaena* Walker (1848). In 1912 Enderlein described a distinct species from Sumatra under the name *Prionocera flaviceps*. In 1921 Enderlein erected the genus *Plocimas* for a new species from southeastern China, described as *P. magnificus*. To this genus I would refer the *Pselliophora serraticornis* Brunetti (1911), and *P. ? elongata* Edwards (1913), both from Ceylon. Mr. Edwards (*in litt.*) informs me that the two species are synonymous. We thus have two closely allied genera, *Prionota* with a single serration on the lower side of each flagellar segment, *Plocimas* with two such serrations, one being basal, the other apical. The synonymy of the two genera may be outlined as follows:

Prionota van der Wulp; Notes Leyden Museum, 7: 1-2; 1885.

P. nigriceps van der Wulp; l. c., 7: 2-3; 1885. (Doubtfully distinct from the next).

P. xanthomelaena (Walker); List. Dipt. Brit. Mus., 1:77 (*Ctenophora*); 1848.

P. flaviceps (Enderlein); Zool. Jahrb, Syst., 32: 28-29 (*Prionocera*); 1912.

Plocimas Enderlein; Zool. Anzeig., 52: 226; 1921.

P. magnificus Enderlein; l. c., 52: 226-227; 1921.

P. serraticornis (Brunetti); Rec. Ind. Mus., 6:242 (*Pselliophora*); 1911.

Syn. *P. elongata* (Edwards); Ann. Mag. Nat. Hist., (8) 12:202 (? *Pselliophora*); 1913.

NOTES ON *CULEX FLORIDANUS* D. & K.¹

(Diptera, Culicidae)

By W. H. W. KOMP

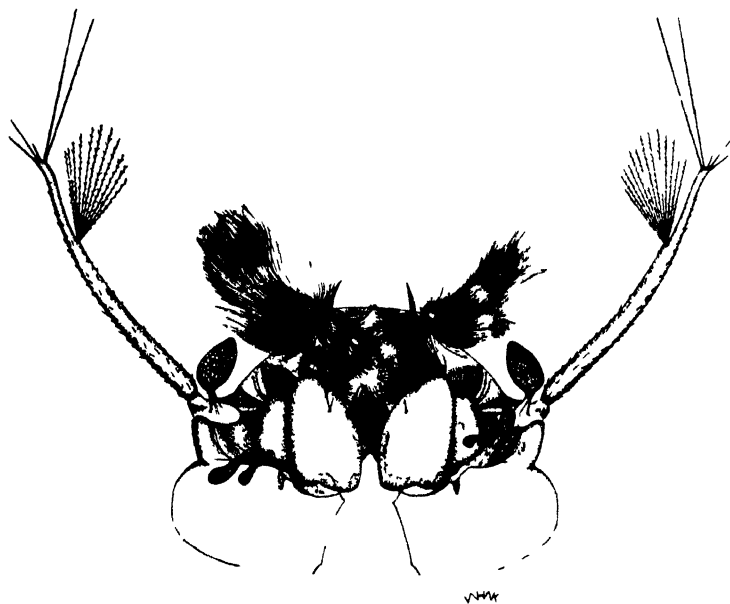
During the year 1922, in the course of malaria research studies which were carried on under the direction of Special Expert M. A. Barber, U. S. Public Health Service, several pools on the outskirts of the town of Brewton, Alabama, were kept under constant observation. One pool was an old railroad borrow-pit, another a large pool in an open pasture, and another a low, water-logged area between two cultivated fields. Third-stage larvae of *Culex floridanus* D. & K. were found in a small grassy pool separated from the main body of water in the railroad borrow-pit July 21. Several of the larvae transformed in the laboratory, and a male emerged a few days later. Collections made August 3 in the water-logged area showed full-grown larvae of *C. floridanus*, and a day later several pupae were collected. Following this, a prolonged dry spell ensued, broken by thunder-showers of short duration. On October 2 a heavy rain fell, and seven days later the large pool in the pasture was examined. This pool had been dry for thirty-one days previous, the dried mud in the bottom being cracked and fissured to a depth of an inch or more. Several dozen pupae of *Culex floridanus* were collected at this time, associated with small *Anopheles crucians* larvae, and pupae of *Psorophora discolor*. A second search of the pool October 10 showed several more pupae, and a single dead larva of *C. floridanus*, probably killed by an application of Paris green made to destroy *Anopheles* larvae. The railroad borrow-pit was examined October 11, after its numerous depressions had been filled with rain, after a protracted dry spell. Large numbers of *Culex floridanus* larvae were found in these grassy pools, and, indeed, after the rains of October 2, 7 and 8 and thereafter, the larvae were common in almost every pool and ditch that was examined. The last collections in the neighborhood were made November 6, and large num-

¹ From Field Investigations of Malaria, United States Public Health Service

bers of this species were noted in the grassy bottom of anti-malaria drainage ditches dug earlier in the season. A close watch was kept for eggs, but no egg-masses were found anywhere. The females were not observed to bite at any time.

These observations may be summarized as follows: *Culex floridanus* larvae were first found July 21, in a grassy, semi-permanent pool, later in permanent water with aquatic vegetation, and again in a pool with muddy bottom and almost no vegetation, which had been dry for thirty-one days previous to the rainfall which then filled it. After the heavy fall rains the larvae were common in ditches and pools filled with rainwater. The three pools mentioned above had been under constant observation from January, 1922. Large numbers of larvae were observed as late as November 6. The egg-laying habits were not observed, but seem to be peculiar, as the seasonal history points to an overwintering egg, with possibly but a single brood, as in several species of *Aedes*.

The larvae of *Culex floridanus* are unique in possessing accessory tracheal gills borne as appendages on the head. So far as is known, this is the first recorded occurrence of such structures in a Culicid. They are adaptations permitting the larva to remain at the bottom of the pools which it inhabits. The mouth-brushes are very well developed, and are kept in constant motion, thus causing a current of water to flow over the gills, which are full of minute tracheae. The gills are paired appendages, the larger and more noticeable ones arising from the membrane at the base of the antennae, the others from the intersegmental membrane near the insertion of the maxilla and the mandible. This latter pair is attached in such a manner that they move with the maxillae and mandibles when the larva is feeding. This movement also aids in aeration. The large gills are stalked, ovoid in shape, with a large trachea passing up the stalk, dividing into many anastomosing branches in the body of the gill. The smaller gills are composed of two parts, a large club-shaped portion and a smaller portion branching dichotomously. The relative size, shape and position of these structures may be easily discerned by



Head of larva of *Culex floridanus* D & K, ventral view

reference to the accompanying drawing (Pl. IX). In fresh specimens it is possible to trace the tracheae from the gills down through the head, into the neck, and thence to widenings of the main tracheae, which form air-sacs in the thorax.

Since this structure has been observed, similar but not nearly so well developed tracheae have been observed in another species of *Culex* found in the same locality. In *Culex erraticus* D. & K. the membrane at the base of the antennae is provided with a plexus of small tracheae, and a similar plexus is found in the membrane laterad of the insertion of the mandible and maxilla. The mouth-brushes of this species are well-developed, also, but it has not the habit, so marked in *Culex floridanus*, of lying on its back on the bottom, or hooking itself up by the strong terminal hooks of its air-tube, and feeding by causing a current of water to flow toward its mouth by the action of its large mouth-brushes. The larvae of *Culex floridanus* are very characteristic in appearance and actions as the accessory gills are prominent, and the breathing-tube with its long hair-tufts is held well forward over the dorsum of the abdomen, like a terrier's tail. When disturbed, the larva goes to the bottom, moving the posterior end of the body in short, quivering jerks, very much like the larva of *Psorophora discolor* Coq. in similar circumstances.

ON THE DISTRIBUTION OF LAMPRA BARNESI BENJ.

(*Lepidoptera, Phalaenidae*)

BY WM. BARNES AND F. H. BENJAMIN

Lampra (*Lampra*¹) *barnesi* Benjamin.

1921, Benj., Bull. S. Calif. Acad. Sci., xx (3), 97, pl. ii, ff. 9-9a ♂ genitalia, pl. vi, f. 46 holotype ♂, *Lampra* (*Lampra*).

One male and four females of a species of *Lampra* from Benton Harbor, Michigan; the male bred from larva feeding on apple-buds, June 1916 (Chittenden No. 4963); the females

¹ *Rhynchagrotis* Smith partim.

"on peach," July 1916 (Quaintance No. 10801), were examined, through the courtesy of Dr. H. G. Dyar.

The genitalia of the male are identical with those of the holotype of *L. barnesi* and both sexes can be easily matched with topotypical material from Arizona.

The Barnes Collection contains one female labeled "Oak Creek Cany., Col.," and another females "Miles City, Mont.," from the Jacob Doll Collection, which were omitted from the revision of the genus (see bibliography) as questionable. These localities, in view of the Michigan specimens, are probably correct.

TWO EXAMPLES OF SEXUAL DIMORPHISM IN THE GENUS SERICOMYIA¹

(Diptera, Syrphidae)

By C. HOWARD CURRAN

During the determination of some Diptera in the Canadian National Collection, I discovered a species of *Sericomyia* which I thought must be undescribed, but further study revealed the fact that it is the female of *S. bifasciata* Williston. The only guide to the identity of the species was found in the face, other characters differing rather markedly. A second specimen which belongs in the same category was found in the United States National Museum during a visit last winter, and is undoubtedly the male of *S. sexfasciata* Walk, notwithstanding the remarkably different aspect of the insect. I give a full description of the undescribed sexes of these two species owing to the dimorphism.

Sericomyia sexfasciata Walker.

Readily recognized from all described species by the wholly black pilose pleura, scutellum and abdomen.

Male.—Length 11 mm. Face creamy yellow, with a moderately broad median black stripe which is widest above and

¹ Contribution from Division of Systematic Entomology, Entomological Branch, Dept. of Agriculture, Ottawa.

reaches the base of the antennae; oral margin and cheeks shining black, the color on the latter extending halfway up the face. In profile almost perpendicular, the tubercle moderately large, not very long, as prominent as the tip of the antennal prominence, the lower part produced well below the lower border of the eye. Frontal triangle black, thickly covered except immediately above the antennae, by yellowish white pollen like that on the yellow part of the face. Middle portion of face white pubescent, lateral margins and frontal triangle whitish pilose, the latter with a few black hairs above. Vertical triangle black, thinly pale pollinose, with black pile. Occiput greyish pollinose, black pilose on upper half, white pilose below. Antennae reddish, first joint fuscous, the second somewhat piceous red; third joint sub-rectangular, slightly longer below, the corners rounded, the upper surface convex, slightly broader than long. Arista reddish, its base piceous, the plumes long, sparse, yellow.

Thorax deep shining black, the mesonotum before the suture thinly yellowish pollinose, leaving a geminate median stripe more shining in certain lights. Pile on pollinose portion and narrow upper margin of pleura, yellowish, elsewhere black, not long. Scutellum concolorous with thorax, wholly black pilose.

Femora black, their apices narrowly reddish; tibiae reddish, their middle half or more brownish, diffuse; tarsi blackish, the first joint reddish, the second brownish. Hind trochanters without spur.

Wings yellowish anteriorly, the color fading to almost hyaline or cinereous posteriorly. Third longitudinal vein distinctly curved upward beyond the middle of the first posterior cell, as in the female. Squamae and halteres yellow, the former with yellow fringe.

Abdomen opaque black, the first segment, lateral margins and apices of the segments increasingly more widely so, shining deep black. Yellow fascia on second segment slightly oblique, their postero-lateral corner rounded, their hind margins practically straight, inner ends slightly narrowed, sharply

rounded in front, their outer ends occupying nearly one-third the length of the segment as it is rather suddenly triangularly produced forward, rather narrowly interrupted. The bands on the third and fourth segments are similar in shape but only slightly widened laterally, nearer the front margin and very narrowly interrupted. Fourth segment half shining. Pile black, except a few hairs laterally on apical segment and most of the ventral hairs.

The specimen from which this description is drawn is from Franconia, New Hampshire (Mrs. Slosson). There is another specimen in the Museum of Comparative Zoology at Cambridge. The female has the first abdominal band extremely broad, the two following broad, widest medianly. The pile of the pleura, front half of dorsum and whole margin of posterior half, and basal two abdominal segments whitish or pale yellow. The legs are darker, the wings almost hyaline.

Sericomyia bifasciata Williston.

Face produced conically downward, with a median black stripe, scutellum black; abdomen with three transverse narrowly interrupted reddish bands.

Female.—Length 11 mm. Face honey yellow, thinly covered with pale yellowish pollen; a median stripe, narrow oral margin and cheeks, shining black; in profile almost perpendicular, the tubercle rather long and conspicuous; produced so that about two-thirds of the face is below the eyes. Sides of face, extending above to the base of the antennae, pale yellowish pilose. Front shining black, the sides below, connected with a narrow band on the lower third, thickly pale yellow pollinose; pile black, not long nor abundant. Occiput with yellowish pollen, which becomes grey above, and yellow pile. Antennae piceous, the third joint more reddish below. Arista black, or brown, the black hairs forming the loose plume about one-fourth as long as the arista.

Thorax shining black, the dorsum with a bluish reflection in some lights; humeri and a less dense band between, greyish white pollinose. Pile brassy yellow, longer on the sides and

pleura. Scutellum concolorous with the dorsum of the thorax, with similar pile.

Femora black, the apices reddish, more broadly so above. Tibiae reddish, on the outer side with obscure median spot of blackish or brown. Tarsi reddish, the last three joints brown or black.

Wings cinereous hyaline, yellowish before the fourth longitudinal vein to about the middle, where there is a slightly darker area extending almost to the anal vein along the veins at the apex of the second basal cell. The cinereous color is a little condensed apically in the marginal and submarginal cells.

Abdomen opaque black; first and fifth segments wholly, sides of all the segments and the rather broad hind margins of the second, third and fourth, shining black, but because of the bright pile appearing more or less brassy on the terminal segments. All the bands transverse, placed a little before the middle of the segment, their outer ends broadest, so that the black before and behind is about equal: the front margin transverse, the hind slightly oblique; inner ends sharply rounded, the outer truncate. The bands are all separated from each other medianly by the same interval; the first band reaches the lateral margin by a prolongation forward and extends to the base of the segment where there is a small reddish transverse spot; the bands on the third and fourth segments are narrowly separated from the lateral margin. Pile bright yellow, appressed; on the sides and terminal segments longer, erect. Sternites blackish blue, the incisures narrowly reddish; the base of the second segment rather broadly diffusely reddish; membrane fuscous, with a reddish spot opposite the incisures.

♀ Bathurst, New Brunswick, June 15, 1922 (J. N. Knull); 2 ♀, Lac la Pêche, Quebec, June 30, 1919 (M. B. Dunn); ♂, same data.

The ♀ is similar to *lappona*, of Europe, and is probably the one on which that species was recorded from Quebec by Van

der Wulp. It differs from *lappona* by the conically produced face, black bases of the femora, smaller size, etc. Very similar to *chalcopyga*, but the face is longer, the femora more extensively black, the abdominal bands wider laterally and narrower medianly and the venter has not distinct yellow segmental apices. From *cynocephala* Hine it is distinguished by the black facial stripe. It is readily distinguished from *chrysotoxoides* by the transverse bands and cannot be confused with any of the other described species.

The following table will aid in recognizing the North American and European species of *Sericomyia* and *Condidea*.

1. Abdomen with only one yellow band.....*carolinensis* Metcalf
Abdomen with two or three yellow or whitish bands, or spots arranged in rows—first band sometimes very wide..... 2
2. Face without a median black stripe..... 3
Face with a median black stripe..... 4
3. Third vein strongly curved into first posterior cell; first pair of spots very large, the following bands broken into spots,
Condidea lata Coq.
Third vein nearly straight; face strongly produced downwards; abdomen with three bands.....*cynocephala* Hine
4. Fourth abdominal segment without a crossband; those on the second and third distinct ♂.....*bifasciata* Willist
Normally three bands, if only two, none on the second segment... 5
5. Third vein moderately curved into the first posterior cell; first band (♀) almost twice as wide as the following; abdomen of ♂ with usual bands and almost entirely black pilose....*sexfasciata* Walker
First band scarcely wider, or decidedly narrower than the following; abdomen of ♂ largely yellow pilose..... 6
6. Scutellum distinctly reddish; femora practically all reddish,
lappona L.
Scutellum sometimes reddish (usually black); if reddish, the femora over half black..... 7
7. Spots on the second segment small, often wanting; all the spots small, oblique, dash-like, widest medianly; ground color black; scutellum often somewhat reddish; ♂ hind coxae with a spur,
militaris Walker
Spots on the second segment very distinct, those on the following segments wide laterally; hind coxae of ♂ with or without spur.. 8
8. Abdominal spots oblique.....10
Abdominal spots transverse..... 9

9. Face produced strongly downwards; hind femora of ♀ black except the apices; abdominal bands cut off obliquely behind, transverse in front ♀.....*bifasciata* Willist
 Face not abnormally produced; abdominal bands not oblique behind, only scarcely wider laterally; hind femora over one-third reddish, fifth segment without red hind border.....*chalcopyga* Loew
 Face not abnormally produced; abdominal bands but little oblique behind; fifth segment with red hind margin.....*borealis* Fallen
10. Hind coxae of ♂ with strong spur on inner-posterior side; hind femora chiefly black pilose below.....¹*calcarata* Curr. (ms)
 Hind coxae of ♂ without spur; hind femora pale yellow pilose below,
chrysotoxoides Macq.

NEW ENCYRTIDAE FROM AUSTRALIA—II

(Hymenoptera)

By A. A. GIRAULT

The following are abridged descriptions. All from Queensland unless otherwise stated.

Austroencyrtus, new genus (Encyrtini).

Runs to *Neocopidosoma* but as *Pseudencyrtella* otherwise, scape from above clypeus, flagellar joints elongate. Marginal twice longer than wide, half the curved stigmal, latter a bit shorter than postmarginal; head nearly as wide as long, jaw-teeth unequal, 1 strong, 2 weaker but as long, 3 shorter, obtuse; 3 of maxillary palpus shortest, 4 elongate, subacuminate, 1 long. Ovipositor three-fourths surface. Club solid.

Austroencyrtus annulicornis, new species.

Robust, dark aeneus, fore wing slightly smoky to apex from about bend of submarginal, veins brownish. Funicles 5–6 white, basal two-thirds of scape, ovipositor valves save apex more or less widely, tarsi, tibiae, knees, rich reddish brown. Sculpture fine, small pin-punctures occasionally. Pedicel not half funicle 1 which is longest, a quarter longer than 6 which

¹ Female not known: probably very similar to *militaris*.

equals club, latter about four-and-a-half times longer than wide. About seven lines cilia proximad hairless line.

Kuranda (types) and Nelson.

Anagyropsis richteri, new species.

Purple, abdomen green, legs except coxae and the femur and tibia 1 (except apex of latter) and antennae save scape and pedicel (except apex of latter), reddish yellow. Wings clear, a bit clouded along each side of stigmal, venation reddish. Marginal half longer than wide, stigmal very long and slender, a bit curved, postmarginal not quite half of stigmal, exceeding marginal. Funicle 1 small, quadrate, 2-3 each a bit longer than wide, longest, somewhat shorter than the short pedicel, 6 largest, a bit wider than long. Scape greatly dilated. Ovipositor nearly half the depressed abdomen.

Ipswich, forest.

Epitetrалophidea bicinctipes emersoni, new subspecies.

Like typical form but cinctus of femur 2 twice longer, over twice the white distal of it, subequal to white proximad of it.

Lota, grass, March, 1921.

Mesastymachus, new genus.

As *Neastymachus* but like *Aphycus* except marginal twice longer than wide, a bit shorter than either stigmal or post-marginal. Scape a bit compressed. Frons moderately wide, prominent.

Mesastymachus silvae, new species.

Golden, abdomen darker, the large wings clear, veins yellow. Club large, ovate, not quite equal funicle, joints of latter small, 1-2 subglobular, 3-4 half wider than long, 6 longest, nearly twice wider than long. Tooth 3 of jaws shorter and more obtuse than the small, acute 1-2. Pedicel somewhat longer than wide, hispid above. Hairless line open, about 10 lines proximad of it. Ovipositor shortly extruded, free. Submarginal bristles moderate.

Nelson.

Pseudectroma obscura, new species.

As *auricorpus* but dusky yellow, ovipositor half abdomen, paler toward base, frons over thrice the narrower eyes, ocelli in a straight line, cheeks nearly thrice the eye-length. Abdominal markings obscure.

Nelson. Types compared.

Neasteropacus obscurus, new species.

As *cinctipes* but funicle concolorous, 5-6 lines distinct discal cilia proximad hairless line, ocelli nearly in isosceles triangle.

Nelson. Types compared.

Neasteropacus varicornis, new species.

As *obscurus* but fore wing lightly clouded throughout, funicle 6 white, stigmal knob enlarged comparatively and tibia 2 concolorous except apex latter widely.

Wynnum, September 11, 1921, forest. Types compared.

Australaphycus, new genus.

From *Aphycus* in having flagellum cylindrical, all joints longer than wide, scape long, obclavate, compressed; head weak, inflexed, face sunken, frons rather narrow, ocelli nearly in equilateral triangle. Ovipositor free, extruded nearly length of abdomen. Postmarginal nearly half the stigmal. Jaw-teeth short, 1-2 acute.

Australaphycus albioviductus, new species.

Gold, wing subhyaline and densely ciliated, following black: Pronotum except laterad, scutum except lateral margin rather widely, scutellum except apex narrowly, axillae mesad, dorsal abdomen except lateral margin narrowly. Hind femur at base, club, pedicel above from base, dusky. Ovipositor valves snow-white. Hairless line narrowly closed caudad, proximad of it, cilia running nearly to base. Flagellum dusky, funicles 1-3 equal, over twice longer than wide, equal pedicel, 4-6 each a bit longer. Club half the funicle, 1 nearly half the region. Finely scaly.

Brishane, November, 1916 (Hacker).

Blattacidella, new genus.

As *Epiblatticida* but jaw-teeth 1 and 2 equal, strong, longer, acute, 3 not quite so wide as in named genus, shortest; scape's exfoliation only central, smaller; funicles wider. Marginal somewhat longer than wide, equal postmarginal, latter nearly two-thirds stigmal. Ovipositor not extruded. Scrobes deep, not long, complete.

Blaticidella aereitibiae, new species.

Aeneus, wings clear, knees, tibial tips, tarsi yellow, veins dark; frons pin-punctate, dorsal thorax with rather sparse yellow pubescence. Hind wings finely ciliate, very wide. Submarginal bristles stouter. Otherwise about as in genotype of named genus.

Nelson. Types compared.

Arhopoideus tertius, new species.

As *brevicornis* but funicle 2 distinctly shortest, a bit longer than wide, 3 equal 4, twice longer than wide, stigmal curved, postmarginal half it.

Wynnum, in grass, September 21, 1921.

Perissopterus cowperi, new species.

As *ciliatus* Dodd but abdomen with four distinct cross-stripes from base, marginal spot in place of a fifth, fringes twice longer (one-fifth wing width), wing pattern slightly different.

Tingalpa, forest, June.

Perissopterus emersoni, new species.

As *cowperi* but a sixth cross-stripe on abdomen beyond the indicated fifth indicated by transverse marginal spots; a patch of discal cilia at base, three longitudinal lines deep from venation; fringes one-tenth wing width; 12-13 setae upon marginal vein; a narrow dusky line on each side meson of thorax. Lateral margin propodeum black.

Sweeping flowering *Leptospermum*, Wynnum, September 23, 1921.

Mesorhopella, new genus.

As *Pararhopella* but antennae with club elongate, cylindrical, joints much longer than wide; marginal punctiform, stigmal and postmarginal long, equal. Frons wide, head rather weak. Jaw 2 widely truncate but a bit concaved.

Mesorhopella emersoni, new species.

Grass green, wings clear, veins dark, coxae, femur 3 save apex, tibia 3 except base and apex (latter more widely), concolorous; rest of legs and scape yellowish white. Club 1 four times longer than wide, not shortening in succession. Funicles 1 and 2 equal, a bit wider than long, 3 a bit longer than wide, 4 and 5 equal, nearly twice longer than wide. Hairless line closed caudad of middle, proximad to cilia occurring well toward base. Minute.

Wynnum, forest, September 20, 1921.

Pararhopella, new genus.

Genotype: *Metalonnella longfellowi* Gir. Jaw teeth acute.

Parahopella maculatipes, new species.

Legs and antennae dark, ovipositor extruded one-third abdomen, stigmal shorter. Grass green, wings clear, base of scape narrowly, pedicel beneath and legs (except coxa 3), side femur 1 save above at apex, basal half tibia 1 above, tibia 2 just below knee, femur 3 save at apex and two cincti on tibia 3, white. Funicles 1-3 equal, half wider than long, 4-5 equal, twice larger but similar in shape. Jaw 2 a bit longest. Marginal equal postmarginal. Hairless line closed caudad by three lines of cilia, proximad of it, six lines of cilia. Submarginal setae moderate.

Wynnum, forest, June 8, 1921.

Ooencyrtus auricaput, new species.

Grass green, scutum and scutellum with short silvery pubescence; head golden, vertex orange, legs except hind legs (except tibial tips, tarsi) whitish, scape pale yellow, rest of an-

tenna dusky. Fore wing with a large smoky cloud from marginal and stigmal, halfway across. Funicles, except the longer 6, equal, half wider than long, the large club equal funicle. Scape slender, pedicel barely longer than wide. Abdomen one-fourth longer than wide, ovipositor not extruded. Hairless line guarded proximad by four and half quarter-lines of distinct cilia and many abruptly fainter lines of minute cilia.

Wynnum, forest, September 22, 1921.

Ooencyrtus magnithorax, new species.

As *metallicus* but wings clear, coxae, femora 1 and 3, tibia 3 save apex, concolorous; funicles 1-4 equal, about twice wider than long, 5-6 nearly twice longer, a third wider than long, club exceeding funicle. Flagellum concolorous, tibia 2 dark centrally. Ovipositor somewhat extruded. Jaw teeth acute, equal.

Nelson, with type of *Casca nigra*.

Encyrtoidea, new genus.

As *Zooencyrtus* but marginal twice longer than wide, stigmal very long and slender, with a knob, about twice the marginal, somewhat shorter than postmarginal. Flagellum capitate, club somewhat over half the funicle. Scape's dilation moderate. Jaw teeth rather large, subacute, 1 a bit shorter in the one, in other 3 but a truncation from base of 2 which slightly exceeds 1. Frons moderate, subprominent.

Encyrtoidea punctatifrons, new species.

Aeneus, scutellum grass green, tibial tips, tarsi white, tips tibiae 2 widely and tarsi 2, reddish yellow, the fore wings distad of venation, lightly smoky, midlongitudinally further proximad; funicles 5-6 whitish yellow. Pedicel distinctly exceeding any funicle, 1 of the latter longest, equal 2, each a bit longer than wide, 3-4 quadrate, 6 a bit wider than long. Frons with rather thick, small but distinct punctures, rest faintly reticulated.

Wynnum, forest, September 20, 1921.

Habrolepopterygis permirus, new species.

As *mirabilis* but both jaws 3-dentate, 3 truncate but not very wide; "V" of setae proximad of hairless line as in *felix*, that is, full interiorly; mesal bristle of 4 of maxillary palpus on the lower apex of the obliquely truncated apex (halfway down the side in *mirabilis*, the apex not oblique).

From *Ceroplastes ceriferus*, Brisbane, "20-1-19," H. Jarvis, through Dept. Apriculture and Stock.

The third Australian species, all markedly alike in color and wing pattern, but differing in mandibular structure.

Microencyrtus, new genus.

Runs to *Zaomencyrtus* but jaws with 1 and 2 small, acute, 3 widely truncate. Minute. Marginal twice longer than wide, thickened somewhat, stigmal and postmarginal equal, a bit shorter. Ovipositor not free, valves extruded half abdomen. Club ovate, nearly as long as the funicle.

Microencyrtus minutissimus, new species.

Dark green, wings clear, with a small cloud against marginal; base and tips of tibiae (tips widely in 3), leg 2 except coxae, all tarsi, yellow, also funicle and club. Funicles 2-3 two-and-a-half times wider than long, 1 a half wider than long, rest larger, 6 nearly twice wider than long, longest; pedicel equal 5 and 6 united. Scape thick, cylindrical. Hairless line open caudad, four lines of fine cilia proximad of it, several lines to base or nearly along submarginal.

Wynnum, forest.

Erycidnus stigmatifera, form **hemiptera**, new.

Marginal comparatively short and thick, far from apex, stigmal distinct, one-third marginal, postmarginal acute, one-fourth shorter than stigmal. Hairless line present. Submarginal setae long, slender, those of marginal short. Fore wing nearly entirely clouded. Hind wing linear. Club, funicle 6 white, rest black, legs reddish yellow. Frons narrow.

Wynnum, forest. Types compared.

Conchynilla fuscipennis, new species.

As genotype but wing plainly infuscated from base of submarginal to apex, the infuscation streaked with subhyaline in the form of a "T" distad of venation, a wide middle path to apex and an equally wide cross-stripe at apex of venation; funicles 1-3 somewhat longer than wide, rest quadrate; club two-thirds funicle and wider. Postmarginal half stigmal.

Lota, forest, March.

FOOD-PLANT OF HYBLAEA PUERA CRAMER

(*Lepidoptera, Noctuidae*)

By HARRISON G. DYAR

The larvae of *Hyblaea puera* Cramer were found abundantly on a large tree in Kingston, Jamaica, which has been determined as *Catalpa longissima* (Jacq.) Sims. by Mr. Paul C. Standley. Having only a few hours ashore from the boat, what material could be found was hastily collected, and unfortunately, the specimens of larvae secured pupated before a description could be made. The larvae are spun up in the leaves in tight cases, such as made by Pyralids, and their general pale color and weakly striped markings also resemble those of Pyralids. The larvae of the species of *Dichogama* which I formerly found in Florida present a similar general appearance.

Date of publication, October 5, 1923.

Insecutor Inscitiae Menstruus

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Nos. 10-12

NEW SPECIES OF AMERICAN GEOMETRIDAE IN THE UNITED STATES NATIONAL MUSEUM

(*Lepidoptera*)

By WM SCHAUS

Trichogompha joevinaria, new species.

Male.—Palpi, lower part of frons, and a line behind eyes chestnut; vertex whitish buff; collar and patagia pale neutral gray; abdomen above drab gray with some chestnut shading at base, on second segment posteriorly, and laterally on two basal segments, underneath whitish. Fore wing above drab gray suffused for two-thirds from base with brownish drab except on a large triangular costal spot on second third of wing; outer part of darker space crossed by thick olive buff striae, and followed by a series of small silver spots, the two nearest costa larger, outwardly edged with velvety black; a subterminal silver line, curved at apex; cilia brownish drab tipped with white. Hind wing above drab gray with medial and postmedial brownish drab striae, also some postmedial olive buff striae; costa silvery whitish gray; the postmedial striae followed by five silvery spots outwardly edged with velvety black; an interrupted subterminal silver line. Wings below dusky drab; a light buff triangular spot on costa of fore wing; the hind wing with inner margin from below cell to beyond middle white, partly crossed by a drab medial bar. Expanse 23 mm.

Habitat: Geldersland, Surinam.

Type Cat. No. 26544, U. S. N. M.

Trichogompha saumayaria, new species.

Male.—Palpi and head whitish buff. Body and wings above snuff brown; body below and legs whitish buff. Wings crossed

by whitish buff striae especially on postmedial space and followed on each wing by five silver spots outwardly edged with velvety chestnut black and a fine orange buff line; a subterminal silver line cut by veins; cilia deep mouse gray tipped with white. Fore wing: a small orange buff antemedial spot across costa to within cell, and a similar postmedial line from costa to vein 5. Hind wing: costa broadly silvery white, expanding at base to median, narrowing at apex. Fore wing below: inner margin broadly white, the cell and anterior postmedial space suffused with dull gray, the costa with antemedial and postmedial yellow spots, and intermediate dark striae; termen broadly dusky drab. Hind wing below whitish buff suffused with drab gray; a dark spot on discocellular and a fine postmedial line; termen broadly dusky drab. Expanse 19 mm.

Habitat: Peru.

Type Cat. No. 26515, U. S. N. M.

Allied to *T. opulenta* Thier.-Mieg. The wings narrower and very different on underside.

Opisthoxia vitenaria, new species.

Male.—Head and thorax saccardo's umber; abdomen and legs white. Fore wing above white; a broad fascia from base to apex and termen below vein 5 saccardo's umber except a white streak along costa; some black and faint white striae on fascia. Hind wing above white thinly irrorated from below costa and vein 6 with black; a small postmedial ocellus between veins 6 and 7, black and silver on a narrow light yellow ground, preceded by a short silver streak and followed by a silver line extending to costa; a small marginal silver spot above vein 4 joined to an orange and black point; some terminal silver scaling on interspaces below vein 4; cilia buff yellow changing to white at apex. Wings below white, the apex of fore wing hair brown, wide on costa, narrowing to vein 4. Expanse 32 mm.

Habitat: Orizaba, Mexico.

Type Cat. No. 26546, U. S. N. M.

Belongs to the group of *O. amabilis* Cram.

Opisthoxia saturaria, new species. ·

Female.—Palpi and body above light drab, the basal segment of abdomen snuff brown; body below white, the legs light buff. Fore wing above fawn color except base to end of cell which is light drab with whitish striae, crossed by a fine indistinct, curved antemedial fawn color line; a darker fawn color streak on discocellular; postmedial line fine, darker, deeply outcurved and inbent to before middle of inner margin, followed by a triangular white spot on costa to vein 6, and from below vein 3 broadly edged outwardly with white; a white spot at anal angle with brown striae; cilia light drab. Hind wing above: base snuff brown limited by a silvery white fascia; the inner margin white from base to middle; wing otherwise avellaneous mottled with ochraceous buff and numerous fine black striae except on apical area; postmedial space between veins 6 and 7 cinnamon rufous, inwardly edged by a silver line extending below vein 6 and above vein 7, and containing a black ocellus with a curved silver line, and edged by a light line; a subterminal silver line between veins 6 and 7 and some white shading along vein 7 to termen; an interrupted terminal silver line from discal fold to anal angle. Wings below white, the termen of fore wing to vein 2 hair brown, widest on costa; hind wing with a small postmedial black spot between veins 6 and 7, and the cilia light buff. Expanse 30 mm.

Habitat: Volcan Santa Maria, Guatemala.

Type Cat. No. 26517, U. S. N. M.

Without a male the generic position is doubtful

Ophthalmophora cabima, new species.

Female.—Head and palpi light drab; thorax hair brown; abdomen above drab gray, the basal segment benzo brown, the second segment mostly white; body below white, the legs white, the fore tibiae and tarsi streaked with drab gray. Fore wing above hair brown; costa except at base and apex light buff, the costal edge light ochraceous buff; silver streaks above and below vein 7 not reaching termen; inner margin narrowly silver white suffused with naples yellow, the fringe primuline yellow;

a fine white line on discocellular; a faint postmedial line, slightly curved from costa to vein 1 near termen, defined by darker edging; marginal silvery streaks on interspaces from below vein 4. Hind wing above: base narrowly hair brown followed by a silver bar; inner margin whitish preceded by a silver streak from bar to termen; cell just beyond bar yellow finely irrorated with hazel, the space below and beyond cell mottled white with hazel striae, crossed postmedially by a fascia of silver scales; terminal half above vein 6 consisting of finely striated gray scaling with a black ocellus edged with light buff and containing an iridescent silver spot, termen narrowly cream color expanding somewhat at apex, preceded by silver scaling, interrupted at vein 6 and expanding into a round silver spot above vein 1; cilia mustard yellow. Fore wing below drab gray, the costa light buff. Hind wing below pale drab gray; a deep mouse gray bar from costa near apex to termen at vein 1, the termen beyond it whitish. Expanse 28 mm.

Habitat: Cabima, Panama.

Type Cat. No. 26518, U. S. N. M.

Comes nearest *O. phrynearia* Schaus, the male of which has the antennae thickened and serrate, whereas in *O. cabima* they are fasciculate; the hind wings are also quite different.

***Ophthalmophora monanaria*, new species.**

Male.—Head and palpi cinnamon drab; thorax drab gray; abdomen drab gray above, the basal segment benzo brown in front, behind and also second segment silvery drab gray, the third and fourth suffused with cinnamon drab and with white segmental lines; body below silvery whitish buff, the base of abdomen drab gray, the legs silvery light buff. Fore wing benzo brown; costal margin mustard yellow; inner margin from before middle silvery white expanding to vein 2 at termen; a faint whitish line on discocellular; a postmedial grayish buff line outcurved from costa; some silver scaling on base of costa, along subcostal, and above and below vein 7; cilia drab mottled with light buff at interspaces, at tornus cream color. Hind wing: base benzo brown followed by a silver bar; cell yellow ochre with very fine striated hazel lines; space below cell and

vein 6 white mottled with ferruginous scales; space beyond cell and above vein 6 pale salmon color minutely irrorated with hazel; a subterminal large round black ocellus edged with light buff and containing a patch of iridescent blue scales; a short silver line before ocellus; a subterminal broad silver line from costa to below vein 6, the termen beyond and cilia deep chrome; a round silver spot above vein 4 and terminal silver scaling to anal angle, also a streak before inner margin; cilia at anal angle white. Fore wing below drab gray, the inner margin white, the costa light buff. Hind wing below white, the termen from costa to vein 6 hair brown; the ocellus indicated in transparency. Expanse 27 mm.

Habitat: Surinam.

Type Cat. No. 26549, U. S. N. M.

The male antennae are pectinated and the species comes near *O. bolivari* Oberthuer. It differs in the continuous silver line on hind wing from costa to below 6.

Bapta angelica, new species.

Male.—Body white, the frons dark brown; legs white, the fore tibiae and tarsi ochraceous buff. Wings silvery white without any markings. Expanse 21 mm.

Habitat: Santiago, Cuba.

Type Cat. No. 26550, U. S. N. M.

Melinodes priscanaria, new species.

Female.—Head, thorax and wings light ochraceous buff, the head and thorax irrorated with ochraceous orange; collar hair brown; abdomen light ochraceous buff dorsally irrorated with ochraceous orange and mottled with drab, the tuft at base hair brown; legs light ochraceous buff. Wings irrorated with black and ochraceous orange striae, the lines cinnamon brown; cilia light buff mottled with ochraceous orange and with hair brown spots at veins. Fore wing: costa suffused with ochraceous tawny, the extreme edge hair brown; antemedial line vertical, slightly toothed at median; a curved line on discocellular; post-medial slightly outcurved from costa to vein 4, incurved below 4, followed between veins 3 to 5 by a verona brown shade to

termen; an incurved subterminal verona brown thick line from costa to vein 5; a spot between veins 2 and 3 beyond postmedial line; a terminal line. Hind wing: a postmedial line bifurcating at vein 3 to inner margin near middle and near anal angle; the terminal line crenulate. Wings below light buff with faint drab striae, the lines faintly indicated, the terminal line distinct, hair brown; the suffusion to termen between veins 3 and 5 and the subterminal less distinct. Expanse 30 mm.

Habitat: Volcan Santa Maria, Guatemala.

Type Cat. No. 26551, U. S. N. M.

Allied to *M. iobarris* Dyar.

Macaria zozinaria, new species.

Male.—Head and thorax light drab; abdomen above light buff irrorated with black leaving whitish segmental lines, laterally light ochraceous buff with a series of small black spots; the venter white; legs light ochraceous buff, the tarsi drab. Fore wing light buff thickly irrorated and striated with pale brownish olive; costa deep grayish olive; antemedial and medial fine, sinuous, isabella color lines starting from small fuscous spots on costa, the antemedial vertical, the medial sinuous, both marked by a few black scales on median and submedian veins; postmedial fine, vertical, brownish olive and thicker across costal margin, then with some black scaling and points on veins, proximally with small triangular black spots on veins 3 and 4, followed closely by a fine and indistinct isabella color line, distally expanding into a drab gray spot at veins 3 to 4; termen excised below apex with a fuscous black line and dark cilia; cilia otherwise buffy citrine with a pale line at base. Hind wing with prolonged angle at vein 4, paler than fore wing to postmedial; antemedial and postmedial faint isabella color lines, the latter with a few black scales on veins 3 and 4; a fine darker terminal line; wings below cream color with black irrorations and striae. the veins primuline yellow, the lines mostly sanford's brown; black points on discocellulars. Fore wing: inner margin white; antemedial line blackish, extending to just below cell; medial line sinuous to just below cell; postmedial fine, slightly sinuous, followed by a much thicker line diverging towards

inner margin; a small white space above vein 6, and terminally above 7, the costal space beyond postmedial otherwise mars yellow. Hind wing: the antemedial and postmedial lines thick, a fine black line bifurcating proximally from the postmedial at vein 3; a fine fuscous terminal line towards apex and anal angle. Expanse 32 mm.

Habitat: Incachaba, Cochabamba.

Type Cat. No. 26552, U. S. N. M.

Allied to *M. ostia* Druce.

Macaria santiagaria, new species.

Male.—Head and collar light buff; thorax white; abdomen whitish buff, with a few black and hazel irrorations dorsally; legs whitish, the fore and mid tibiae and tarsi streaked with drab interrupted by light buff rings. Fore wing tilleul-buff; costa streaked with buffy brown forming antemedial, medial, and postmedial spots; a few black irrorations on basal half; a faint light drab antemedial curved line, with a few black scales on median and submedian; a few minute similar points medially above vein 2 and on submedian; a postmedial series of fuscous points on veins, followed by a broad hair brown fascia very slightly incurved from costa to tornus, the fascia sayal brown from costa to just below vein 6 and between veins 4 and 3; faint grayish striae on terminal area; a terminal buffy brown line, more distinct on curve below apex. Hind wing tilleul-buff with more numerous black irrorations, the terminal area tinged with vinaceous buff; a small black spot on discocellular and postmedial points on veins, the fascia of underside visible in transparency; fine terminal buffy brown line, and a short sub-terminal line at tornus. Wings below white with numerous buffy brown striae; a broad outer buffy brown fascia on both wings, on fore wing as on upper side, on hind wing from costa near apex straight to anal angle. Female very similar to male, the postmedial punctiform line expanding into a large fuscous spot above vein 4, the fascia buffy brown cut by white veins from costa to just below vein 3, then reduced to a fine light drab line to tornus; underside with outer edge of fascia lunular. Expanse 27 mm.

Habitat: Santiago, Cuba.

Type Cat. No. 26553, U. S. N. M.

Can be placed near *M. enotata* Guenée to which the female bears a strong resemblance.

***Macaria vulfranaria*, new species.**

Male.—Body white. Wings whitish striated with vinaceous buff, the lines fine vinaceous buff. Fore wing: apex rounded, faintly incurved below apex; lines with small clusters of black scales on veins; antemedial outbent on costa then vertical; medial vertical from costal edge; postmedial outbent on costa, then vertical, thickened by a black line between veins 3 and 4 and there followed by a small black patch; a small fainter patch at costa; a few darker scales on termen. Hind wing: antemedial line almost obsolescent; postmedial lunular dentate with black scales on veins. Wings below white well striated with drab, the lines light drab on fore wing from below costa to submedian fold, the inner margin being clear white; on hind wing the lines are extremely fine, the postmedial faintly double. Expanse 26 mm.

Habitat: Paraguay.

Type Cat. No. 26555, U. S. N. M.

***Macaria cyrilaria*, new species.**

Female.—Body white; basal segment of abdomen above with two black spots, on second segment a broad transverse hazel band. Wings white to postmedial line with a few pale ochraceous buff striae; terminal space suffused with pale drab gray and darker striae. Fore wing with apex rounded, termen slightly incurved below apex, the lines pale ochraceous buff, very fine and faint; antemedial slightly curved; medial sinuous; postmedial wavy, preceded between vein 3 and discal fold by some fuscous black scaling, and followed by similar scaling between veins 3 and 4; an avellaneous line beyond postmedial from costa to vein 6, outwardly edged with white; a fuscous black terminal line between veins 4 and 7 and terminal black points on all interspaces. Hind wing produced at vein 4; a black point on discocellular; the two lines very fine and indis-

tinct. Wings below white, the veins light ochraceous buff. Fore wing: the costa light ochraceous buff with drab striae; inner margin white to postmedial line; antemedial line oblique not reaching margins; a line on discocellular and the vertical postmedial line tawny olive, the latter followed by some yellow ocher suffusions extending to termen between veins 4 and 6; the space between veins 6 and 8 clearer white. Hind wing: antemedial line faint, yellow ocher; a black point on discocellular; postmedial line as on fore wing, the yellow ocher suffusions distally edged with tawny olive. Expanse 25 mm.

Habitat: Trinidad, B. W. I.

Type Cat. No. 26556, U. S. N. M.

Comes nearest *M. evanaria* Schaus.

Macaria acasiaria, new species.

Male.—Body hair brown above, underneath and legs white thickly mottled with hair brown. Wings above to postmedial line white densely striated with hair brown; terminal space hair brown. Fore wing: costa ochraceous buff crossed by hair brown striae; indistinct antemedial and medial vertical lines formed by dense striae; postmedial line brownish buff, lunular, vertical; a fine, indistinct, similar subterminal line; some white mottling at apex and subapically, also faintly in places on termen; cilia tipped with white; the termen very slightly incurved below apex. Hind wing acutely angled at vein 4; a medial and postmedial line as on fore wing, the latter with a few small white spots distally, and some slight white striae terminally at vein 4. Wings below white more thinly striated, the lines more distinct. Fore wing: an oblique line on discocellular; postmedial line suffusing with a broad fascia leaving some small white spots along the latter's proximal edge, the fascia suffused with sayal brown towards costa and expanding to termen between veins 4 and 6 and at tornus; costa to postmedial ochraceous buff. Hind wing with inner and postmedial line as on fore wing, the lunules of postmedial more completely filled in with white, the fascia distally lunular also; a terminal hair brown line on both wings. Expanse 25 mm.

Habitat: Chanchamayo, Peru.

Type Cat. No. 26557, U. S. N. M.

Closely allied to *M. delia* Schaus.

Macaria cayugaria, new species.

Male.—Head and palpi ochraceous tawny; thorax white; abdomen and legs whitish buff, the tibiae and tarsi hair brown. Wings buff white, thinly striated with drab, the lines isabella color. Fore wing: costa light buff with hair brown striae; antemedial line outcurved; medial line outangled on costa, then inbent; postmedial outangled on vein 6, then parallel with medial line, followed by a slightly straighter drab line with small clusters of black scales beyond it above and below vein 7, and a few black scales on its distal edge between veins 3 and 4; an interrupted fine terminal line. Hind wing: antemedial and medial lines, the postmedial broader mostly drab; terminal line as on fore wing. Wings below buff white, the striae coarser, all the lines slightly wider, drab. Expanse 22 mm.

Habitat: Cayuga, Guatemala.

Type Cat. No. 26558, U. S. N. M.

The apex of fore wing is rounded, the termen straight, hind wing slightly angled at vein 4.

Macaria acepsimaria, new species.

Female.—Body and wings whitish buff with a few scattered fuscous scales. Fore wing: apex rounded, termen very slightly incurved below apex; costal margin striated with drab gray; a pale drab gray shade on discocellular; no lines, the postmedial simply defined by the darker proximal edge of the terminal third of wing which is drab. Hind wing with a black point on discocellular; the terminal space slightly paler than on fore wing. Fore wing below whitish buff in disc, the costal margin light ochraceous buff striated with drab; a drab postmedial line; veins terminally light buff, the interspaces irrorated with drab; a black line on discocellular. Hind wing below warm buff striated with hair brown; a black point on discocellular; a postmedial drab line; terminal dark points on interspaces of both wings. Expanse 16 mm.

Habitat: Santiago, Cuba.

Type Cat. No. 26559, U. S. N. M.

Macaria pacianaria, new species.

Female.—Head and body light buff with a few dark irrorationes. Fore wing white striated with pale drab gray, the lines fuscous black; a fine slightly curved antemedial line, followed on inner margin by a fuscous black line; a medial fuscous spot on costa; a drab gray and black line on discocellular; postmedial line slightly inbent followed by a rather broad fuscous shade with its distal side somewhat dentate; termen striated with drab gray, and suffused with ecru drab; a slight terminal drab shade below apex; costa shaded with light buff and striated with drab. Hind wing buff white with a few scattered fuscous scales; a black point on discocellular; a postmedial light drab shade; terminal black points on interspaces of both wings. Wings below whitish; dark lines on discocellulars; costal margins light ochraceous buff with light drab striae. Fore wing well striated with light drab; antemedial line hair brown, double towards inner margin; postmedial line hair brown followed by a similar shade except on costa. Hind wing: antemedial line very faint; postmedial hair brown rather broad; terminal dark lines on interspaces; the veins of both wings light buff. Expanse 17 mm.

Habitat: Santiago, Cuba.

Type Cat. No. 26560, U. S. N. M.

The wings are shaped as in *M. acepsinaria* Schaus.

Drepanodes santiago, new species.

Male.—Antennae shortly pectinated. Body and wings cinnamon buff. Wings with some fine black striae on terminal area; cilia cinnamon shortly tipped with white. Fore wing: a very fine and indistinct antemedial darker line, outcurved on costa, vertical from within cell; postmedial line orange citrine, outangled on vein 7 near apex, inbent to beyond middle of inner margin, distally edged with drab gray finely irrorated with white; a drab gray shade at apex. Hind wing: costa whitish; a medial sayal brown line from subcostal to middle of inner margin. Wings below paler, thinly striated with hair brown; lines almost obsolescent; inner margin of fore wing white, some thick striae at apex of hind wing. Expanse 20 mm.

Habitat: Santiago, Cuba.

Type Cat. No. 26561, U. S. N. M.

A very variable species, sometimes light buff with the post-medial line cinnamon, also with black suffusions across the lines with the antemedial heavily marked. The female is usually vinaceous cinnamon with the lines light buff. Near *D. olyzonaria* Walker, smaller, the termen more rounded.

Euclysia angustitincta, new species.

Male.—Body pale drab gray, the abdomen dorsally suffused with drab gray. Wings with the margins smooth. Fore wing olive drab with numerous darker striae, the termen pale drab gray with a few darker striae, narrow at termen, widest just above vein 4, proximally edged from vein 4 to inner margin by a double fuscous line filled in with army brown. Hind wing slightly darker; a broad postmedial buffy brown fascia irregularly edged with dark striae; termen from apex to angle at vein 4 narrowly pale drab gray, from vein 4 to anal angle brownish olive. Wings below pale drab gray striated with light drab; black points on discocellulars which are also present above; a broad subterminal drab shade. Expanse 52 mm.

Habitat: Cayuga, Guatemala.

Type Cat. No. 26562, U. S. N. M.

Euclysia maurusaria, new species.

Male.—In color like *angustitincta*, differing in the following respect: a thick hair brown antemedial line, outbent from costa to middle of inner margin; the terminal space more even from vein 4 to costa, the ground color not produced towards apex as in *E. angustitincta*, the proximal edging below vein 4 distally undulate; hind wing with postmedial fascia proximally edged with hair brown, lunular dentate with short white streaks on veins. Underneath the subterminal fascia is narrower and preceded by a faint postmedial line. Expanse 46 mm.

Habitat: Cayuga, Guatemala.

Type Cat. No. 26563, U. S. N. M.

Only a single specimen of each species was found.

***Therina mariaria*, new species.**

Male.—Body and wings silvery gray irrorated finely with drab, the lines hair brown. Fore wing: a faint subbasal line; a medial line inbent from costa, almost straight; a fine line on discocellular; postmedial line from costa near apex, lunular, inbent, somewhat incurved opposite cell and below vein 2, outwardly with some faint whitish spots. Hind wing: costa whitish; a medial line from vein 7 to inner margin, almost straight, partly edged outwardly with whitish. Wings below drab gray without markings. Expanse 28 mm.

Habitat: Volcan Santa Maria, Guatemala.

Type Cat. No. 26564, U. S. N. M.

***Ira ruadhanaria*, new species.**

Male.—Body and wings clay color; legs light buff. Fore wing: costal edge white with dark striae; a few dark striae between the two lines, which both terminate on inner margin in large deep neutral gray spots irrorated with white; a similar smaller spot on discocellular with a black point; antemedial line broad, sayal brown, slightly outcurved to median, then more deeply outcurved to submedian; postmedial very faint, lunular dentate with white points on veins, incurved from vein 4 to inner margin; black and white subterminal points on veins, with a few scattered black scales on space before and beyond. A large elongated light buff spot on costa before apex crossed by black striae, the outer part of spot edged with white, and some clay color shading within it at proximal end. Hind wing: a faint medial line; some fine blackish striae on medial space; subterminal points and irrorations as on fore wing. Wings below cinnamon buff irrorated with black, and with black discal points; subterminal space broadly clay color, the termen rather broadly light buff. Expanse 56 mm.

Habitat: Loja, Ecuador.

Type Cat. No. 26565, U. S. N. M.

Male genitalia¹ with harpe simple, very slightly tapering, obliquely truncate at apex; strongly spined only along costa,

¹ Description by C. Heinrich.

with spines longest towards base; costa thickened. Uncus long, hooked, tapering. Socii very small. Gnathos strong, weakly united at extremity by membrane; arms terminating in stout teeth (4 each). Transtilla incomplete; opposing arms connected by central membrane. Aedoeagus long, stout, nearly straight. Cornuti a cluster of (6-10) curved spines over two-thirds as long as aedoeagus. Anellus with juxta a simple, rather weakly chitinized shield; a pair of stout projecting lateral arms lying flat against aedoeagus, as long as tegumen without uncus, apices beak like and turned away from each other (in direction of harpes).

Ira tharbaria, new species.

Male.—Body and wings sayal brown; shaft of antennae irrorated with white, and a white point at base. Fore wing: costa finely deep neutral gray with some white striae and scaling; antemedial sinuous, dark neutral gray with a small neutral gray spot in cell and a large round black spot on inner margin; a neutral gray spot with a black point on discocellular, followed by some blackish shading, extending faintly to submedian; post-medial white points on veins from 4 to submedian, the latter outset above a round black spot on inner margin; a large whitish spot on costa before apex, posteriorly rounded, suffused with olive buff with some black striae and a sayal brown streak on costal edge; subterminal white points on veins proximally edged with black; some dark striae on medial area, and a few black irrorations on terminal space. Hind wing: a few scattered black striae and irrorations; a faint postmedial blackish line with white points on veins; subterminal white points connected by a black line from vein 2 to inner margin. Wings below light grayish buff with a few black irrorations; black points on discocellulars; subterminal space broadly sayal brown, outwardly defined on fore wing by a lunular whitish line from costa to vein 5, and from vein 2 to inner margin, the termen beyond suffused with drab and white, and with a fine terminal white line; cilia mikado brown; on hind wing the termen is suffused narrowly with drab and has a terminal white line. Expanse 56 mm.

Habitat: Colombia.

Type, Cat. No. 26566, U. S. N. M. Received from Mr. P. Dognin.

Male genitalia¹ as in *ruadhanaria* except: Lateral arms of anellus shorter and weaker; not as long as tegumen.

Ira ulpianaria, new species.

Male.—Body and wings cinnamon buff, the latter with some darker striae; the lines a trifle darker, fine, and indistinct; antemedial line outcurved to median, then sinuous with a large round dark neutral gray spot on inner margin; postmedial only defined by white points on veins with a dark spot on inner margin; a dark neutral gray spot mottled with white on discocellular; a large white spot on costa before apex partly suffused with olive buff and dark striae, outwardly with some cinnamon buff; a subterminal series of black and white small spots on veins. Hind wing with black striae on costa and terminal half of inner margin; a very faint medial line; subterminal line punctiform as on fore wing, a few white scales scattered on both wings. Wings below light ochraceous buff with scattered black irrorations and black discal points; costa of fore wing narrowly white at apex and a small subterminal black spot above vein $\dot{1}$. Expanse 42 mm.

Habitat: Chapada, Brazil.

Type Cat. No. 26567, U. S. N. M.

Harpe simple¹ tapering; apex truncate; weakly spined toward costa; costa thickened. Uncus strong, tapering, slightly hooked. Gnathos terminating beneath in a stout cross bar bearing a row of stout spines (6–9) along margin. Transtilla incomplete. Aedoeagus moderately long, stout. Cornuti a cluster of stout spines (8–12) less than one-third as long as aedoeagus. Juxta an elongate shield-like plate with an oval central depression; arms of anellus in the form of a V, attached directly to upper edge of juxta and lying ventrad of aedoeagus, extremities hook-like and pointing inward (toward each other); rest of anellus a finely scobinate band partially encircling the aedoeagus.

¹ Description by C. Heinrich.

Ira valtrudaria, new species.

Male.—Body and wings ochraceous brown, the wings with darker striae; legs light ochraceous with dark striae. Fore wing: lines fine, saccardo's umber; antemedial outangled on subcostal, then vertical to inner margin, terminating in a round black spot; a dark neutral gray spot on discocellular with a black point; postmedial almost imperceptible, outcurved and sinuous with a black spot on inner margin; a white spot on costa near apex mottled with cinnamon buff and crossed by striae of ground color; a fine subterminal line incurved below vein 5 to tornus with a few black and white scales on veins. Hind wing: a black point on discocellular; a fine postmedial line, almost medial, downbent towards inner margin; a fine subterminal dentate line, black near tornus with a few black and white scales on veins. Wings below pale ochreous with some black irrorations; black points on discocellulars; faint traces of a fine postmedial line; a small subterminal black spot below costa of fore wing. Expanse 39 mm.

Habitat: Cachi, Costa Rica.

Type Cat. No. 26568, U. S. N. M.

Male genitalia¹ as in *reducta* except: Cornuti more curved. Ventral plate of anellus with upper margin more deeply concave, lateral margins less so, and with upper angles produced, hook-like and slightly incurved.

Ira chiomaria, new species.

Male.—Body and wings cinnamon buff. Fore wing: a few black striae chiefly on basal half of costa and in cell antemedially; the costal edge black; antemedial and postmedial round black spots on inner margin; a deep neutral gray spot on discocellular containing a black point and neutral gray scaling; no lines or points on veins; subterminal small clusters of black scales on veins; a few scattered black scales on outer half of wing; on costa before apex a large light buff spot edged by a white line behind, suffused with olive buff, its costal edge cinnamon buff crossed by black striae. Hind wing with a few

¹ Description by C. Heinrich.

black striae and a black discal point; a postmedial black line from below vein 2 expanding into a spot on inner margin containing some white scales; small subterminal black and white spots on veins forming a line above anal angle. Wings below tilluett buff irrorated with black; black discal points; termen slightly grayish. Expanse 52 mm.

Habitat: Carabaya, Peru.

Type Cat. No. 26569, U. S. N. M.

In general appearance like *Ira ulpianaria* Schaus, but larger and differing in genitalia.

Male genitalia¹ as in *tharbaria* except: Lateral arms of anellus weak; extremities rounded. Cornuti half or slightly less than half as long as aedeagus.

Ira malchusaria, new species.

Male.—Body and wings sayal brown, the latter with dull black markings. Fore wing: a thick antemedial line expanding into a round spot in cell, into one below cell, and a larger spot on inner margin; some striae on medial space; a large spot at and beyond end of cell centered with deep neutral gray and a black point on discocellular; a diffuse black vertical line from vein 4 near cell to submedian fold; postmedial line, fine, wavy, outcurved well beyond cell, incurved below vein 2 terminating in a small black spot on inner margin; a subterminal line of outcurved lunules; a large light olive buff spot on costa before apex edged by a white line rather wider on costa proximally, crossed in front by black striae. Hind wing: a broad wavy postmedial line; a subterminal line incurved below costa, then wavy to vein 2 and lunular as on fore wing from vein 2 to inner margin. Wings below tilluett buff irrorated with black; black discal points, a faint and fine hazel postmedial line distally broadly shaded with buckthorn brown more pronounced towards costal margins. Expanse 48 mm.

Habitat: Incachaba, Cochabamba.

Type Cat. No. 26570, U. S. N. M.

The genitalia similar to *I. chiomaria* Schaus.

¹ Description by C. Heinrich.

***Ira reducta* Warren.**

Male genitalia¹ as in *ulpianaria* except: Apex of harpe obliquely truncate. Juxta with a spatulate plate attached to upper edge (in place of the V-like structure of *ulpianaria*); the upper edge of this slightly concave and the side margins distinctly so.

***Herbita capnodiata* Guenée.**

Male genitalia¹ with harpe simple, slightly tapering; apex truncate, weakly spined; costa thickened, terminating in a slight hook. Uncus stout, moderately long, sharply tapering, hooked. Gnathos terminating beneath in a stout strongly spined crossbar. Transtilla incomplete. Aedoeagus long, straight. Cornuti a couple of very minute spines, almost obsolete. Anellus as long as harpe, consisting of a pair of long ventral arms arising from a reduced pocket like juxta; arms somewhat sinuate, lying close together beneath aedoeagus and with apices turned away from each other (toward harpes).

***Bassania jocosa*, new species.**

Male.—Head and thorax dresden brown; abdomen light buff dorsally irrorated with black. Fore wing: base, inner margin, costa, and terminal space buckthorn brown with darker striae and some black irrorations; cell medially dusky drab; a light buff spot on discocellular containing a black point; from vein 2 to vein 6 medial space along postmedial line pallid vinaceous drab with dark striae; antemedial line fine, dusky drab, irregular, outcurved; postmedial line inbent from costa at four-fifths to middle of inner margin, fine, fuscous distally edged narrowly with pallid gray scales, wavy to vein 6, then straight, followed from vein 6 to inner margin by a narrow orange cinnamon shade; a subterminal fine, vertical, black line from costa to vein 5, then expanding into a broad dentate, blackish shade. Hind wing pinkish buff, the costa light buff; subterminal space buckthorn brown with black striae; termen broadly deep neutral gray; cilia buckthorn brown. Fore wing below deep neutral gray to median and vein 2, below it white, a large diffuse white

¹ Description by C. Heinrich.

spot beyond cell. Hind wing below isabella color with black irrorations; a black point on discocellular; inner margin buff white. Expanse 44 mm.

Habitat: Incachaba, Cochabamba.

Type Cat. No. 26571, U. S. N. M.

Allied to *B. amethystata* Walker.

***Bassania schreiteri*, new species.**

Female.—Shaft of antennae white; head, thorax and fore wing walnut brown; abdomen deep purplish gray with transverse cameo brown lines dorsally. Fore wing: a fine, cameo brown, outcurved antemedial line; a black point on discocellular finely edged with whitish gray; postmedial line vandyke brown from costa at four-fifths very faintly outcurved on costa and straight to inner margin beyond middle; a faint subterminal narrow black shade almost obsolescent from below vein 5. Hind wing: costa broadly silky whitish, from middle of cell and vein 6 avellaneous with a few black striae; a drab postmedial line more distinct towards inner margin; a faint dark terminal line; cilia walnut brown. Fore wing below with the anterior half light drab suffused with walnut brown apically; a diffuse white shade beyond cell; inner half white. Hind wing below drab, terminally suffused with cinnamon drab, irrorated with black; a black discal point and very faint postmedial line. Expanse 41 mm.

Habitat: Tucuman, Argentina.

Type Cat. No. 26572, U. S. N. M.

THE MOSQUITOES OF PANAMA

(*Diptera, Culicidae*)

By HARRISON G DYAR

The mosquitoes of Panama were first systematically investigated by Mr. August Busck, who visited the Canal Zone and adjoining portions of Panama in 1907. Subsequently extensive collections were made by the late Allan H. Jennings. Mr. James

Zetek and Major L. H. Dunn made still later collections, while in the last few years Mr. J. B. Shropshire has sent in extensive material secured in the now completely sanitated areas. Considerable changes in the mosquito fauna have been wrought by the construction of the canal, with the flooding of the Chagres valley, the destruction of the forest and the extensive sanitation. This latter has been undertaken as a permanent work, the swamps being filled, ponds eliminated and surface water carried in concrete drains. In many areas, therefore, no mosquitoes can now be found where formerly many species were recorded. Moreover, all the bamboo formerly growing along the Chagres River has been destroyed, not a clump remaining, and the mosquitoes addicted to this plant, some fifteen species, have almost completely disappeared from the Zone, and must be sought in less disturbed regions. The present list is offered, based on species recorded up to the year 1922, as a basis for further work. New synonymy, here first recorded, is briefly explained.

Sabethes cyaneus Fabricius.

Culex cyaneus Fabricius, Syst. Antliat., 35, 1805.

Sabethes locuples Robineau-Desvoidy, Mem. Soc. Nat. Hist. Paris, iii, 412, 1827.

Culex remipes Wiedemann, Aus. Zweifl. Ins., i, 573, 1828.

Sabethes bipartipes Dyar & Knab.

Sabethes bipartipes Dyar & Knab, Proc. Biol. Soc. Wash., xix, 136, 1906.

Sabethes chroioptus Dyar & Knab, Ins. Ins. Mens., i, 76, 1913.

Not recorded from Panama, but its occurrence may be expected.

Sabethes tarsopus Dyar & Knab.

Sabethes tarsopus Dyar & Knab, Pros. U. S. Nat. Mus., xxxv, 62, 1908.

Sabethoides chloropterus Humboldt.

Culex chloropterus von Humboldt, Voy. Reg. Equin., (Hist), vii, 119, 1820.

Sabethes nitidus Theobald, Mon. Culic., ii, 347, 1901.

Sabethoides confusus Theobald, Mon. Culic., iii, 328, 1903.

Sabethinus aurescens Theobald.

Sabethinus aurescens Theobald, Mon. Culic., iv., 622, 1907.

Sabethes identicus Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 207, 1907.

Sabethinus undosus Coquillett.

Sabethoides undosus Coquillett, Proc. Ent. Soc. Wash., vii, 186, 1906.

?*Sabethinus intermedius* Theobald, Mon. Culic., iv, 619, 1907.

Wyeomyia (———) agnostips Dyar & Knab.

Wyeomyia agnostips Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 211, 1907.

Wyeomyia modalma Dyar, Ins. Ins. Mens., x, 97, 1922.

The synonymy of *modalma* is here first recorded.

Wyeomyia (Shropshirea) ypsipola Dyar.

Wyeomyia (Shropshirea) ypsipola Dyar, Ins. Ins. Mens., x, 97, 1922.

This may be the male of *agnostips*. In the single male at hand the prothoracic lobes are dark with violaceous reflection, not coppery, and there is no white on hind tarsi. Otherwise the coloration agrees.

Wyeomyia (Triamyia) aporonoma Dyar & Knab.

Wyeomyia aporonoma Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 230, 1906.

Wyeomyia (Calladimyia) melanocephala Dyar & Knab.

Wyeomyia melanocephala Dyar & Knab, Proc. Biol. Soc. Wash., xix, 140, 1906.

Wyeomyia canfieldi Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 207, 1907.

Wyeomyia pandora Dyar & Knab, Smith. Misc. Coll., Quart. Iss., lii, 261, 1909.

Wyeomyia fauna Dyar & Knab, Ins. Ins. Mens., vii, 137, 1919.

Wyeomyia (Dinomyia) phroso Howard, Dyar & Knab.

Wyeomyia phroso Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iii, 149, 1915.

Dinomyia proviolans Dyar, Ins. Ins. Mens., vii, 117, 1919.

Wyeomyia (Dodecamyia) clasoleuca Dyar & Knab.

Wyeomyia clasoleuca Dyar & Knab, Pros. U. S. Nat. Mus., xxxv, 68, 1908.

Wyeomyia (Hystatomyia) intonca Dyar & Knab.

Wyeomyia intonca Dyar & Knab, Proc. Ent. Soc. Wash., xi, 173, 1910.

Wyeomyia (Hystatomyia) circumcincta Dyar & Knab.

Wyeomyia circumcincta Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 210, 1907.

Wyeomyia macrotus Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 212, 1907.

Wyeomyia andropus Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 68, 1908.

Wyeomyia agyrtes Dyar & Knab, Smith. Misc. Colls., Quart. Iss., lii, 265, 1909.

The synonymy of *agyrtes* is here first recorded.

Wyeomyia (Hystatomyia) coenonus Howard, Dyar & Knab.

Wyeomyia coenonus Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., ii, Plate 6, fig. 38, 1912.

Wyeomyia (Decamyia) pseudoptecten Dyar & Knab.

Wyeomyia pseudoptecten Dyar & Knab, Proc. Biol. Soc. Wash., xix, 139, 1906.

Wyeomyia cara Dyar & Knab, Smith. Misc. Coll., Quart. Iss., lii, 264, 1909.

The synonymy of *cara* is here first made.

Wyeomyia (Decamyia) onidus Dyar & Knab.

Wyeomyia onidus Dyar & Knab, Smith. Misc. Coll., Quart. Iss., lii, 261, 1909.

Wyeomyia pantoia Dyar & Knab, Smith. Misc. Coll., Quart. Iss., lii, 262, 1909.

Wyeomyia cacodela Dyar & Knab, Smith. Misc. Coll., Quart. Iss., lii, 265, 1909.

Wyeomyia (Decamyia) eloisa Howard, Dyar & Knab.

Wyeomyia eloisa Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., ii, Plate 6, fig. 36, 1912.

Wyeomyia (Miamiya) codiocampa Dyar & Knab.

?*Dendromyia serrata* Theobald, Mon. Culic., iv, 615, 1907.

Wyeomyia codiocampa Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 209, 1907.

Wyeomyia (Miamiya) hosautus Dyar & Knab.

Wyeomyia hosautus Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 211, 1907.

Wyeomyia symmachus Dyar & Knab, Smith. Misc. Coll., Quart. Iss., lii, 262, 1909.

Wyeomyia eucthes Dyar & Knab, Smith. Misc. Coll., Quart. Iss., lii, 263, 1909.

Wyeomyia (Prosopolepis) jocosa Dyar & Knab.

Prosopolepis jocosa Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 64, 1908.

Wyeomyia (Prosopolepis) prolepidis Dyar & Knab.

Wyeomyia prolepidis Dyar & Knab, Ins. Ins. Mens., vii, 1, 1919.

Wyeomyia (Limatus) durhami Theobald.

Limatus durhami Theobald, Mon. Culic., ii, 350, 1901.

Simondella currustris Laveran, C. R. Heb. Soc. Biol., liv, 1160, 1902.

Wyeomyia (Limatus) paraensis Theobald.

Dendromyia paraensis Theobald, Mon. Culic., iii, 316, 1903.

Limatus cacophrades Dyar & Knab, Smith. Misc. Coll., Quart. Iss., lii, 266, 1909.

Probably not specifically distinct from *durhami*. No differences in larvae or in male genitalia have been shown to exist. The different number of comb-teeth mentioned in the monograph is insufficient.

Wyeomyia (Lemmamyia) asullepta Theobald.

Dendromyia asullepta Theobald, Mon. Culic., iii, 315, 1903.

Limatus methysticus Dyar & Knab, Smith. Misc. Colls., Quart. Iss., lii, 266, 1909.

Wyeomyia (Lemmamyia) pseudomethysticus Bonne-Wepster & Bonne.

Lemmamyia pseudomethysticus Bonne-Wepster & Bonne, Ins. Ins. Mens., vii, 166, 1920.

Probably not specifically distinct from *asullepta*.

Wyeomyia (Phoniomyia) chrysomus Dyar & Knab.

?*Wyeomyia longirostris* Theobald, Mon. Culic., ii, 275, 1901.

Phoniomyia chrysomus Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 208, 1907.

The type of *Phoniomyia*, as shown by Bonne-Wepster & Bonne (Ins. Ins. Mens., ix, 6, 1921) is *longirostris* from Brazil, restricted to a female type. This, according to Theobald's original description and emendations, has the proboscis long, wing scales narrow, prothoracic lobes with metallic (coppery?) reflection; abdominal colors separated in a straight line; legs without white mentioned, but the legs of the type are now broken. The present species, *chrysomus*, differs only in having white on the mid tarsi. It may be the same as *longirostris* from Brazil, but I have no specimens from outside of Panama. Certainly the subgeneric characters seem to correspond, and I am therefore using *Phoniomyia* instead of *Dendromyia* of my former paper (Ins. Ins. Mens., vii, 124-126, 1919). In regard to the latter, Theobald says that the wing scales are "rather broad," which would exclude it from present consideration.

Wyeomyia (———) celaenocephala Dyar & Knab.

Wyeomyia celaenocephala Dyar & Knab, Proc. Biol. Soc. Wash., xix, 140, 1906.

Phoniomyia philophone Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 209, 1907

Wyeomyia megalodora Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 69, 1908.

Wyeomyia mataea Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 70, 1908.

This synonymy is new. The prothoracic lobes are distinctly blue in this species, the proboscis long. In the type of *celaenocephala*, the lobes are rubbed, but it agrees otherwise.

Wyeomyia (Wyeomyia) melanopus Dyar.

Wyeomyia melanopus Dyar, Ins. Ins. Mens., vii, 130, 1919.

This may be the male of *celaenoccephala*. The mid tarsi are without white, which may be sexual.

Wyeomyia (Wyeomyia) leucopisthepus Dyar & Knab.

Wyeomyia leucopisthepus Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 212, 1907.

Wyeomyia abrachys Dyar & Knab, Smith. Misc. Colls., Quart. Iss., lii, 262, 1909.

Wyeomyia chresta Dyar & Knab, Smith. Misc. Colls., Quart. Iss., lii, 263, 1909.

Wyeomyia hapla Dyar & Knab, Smith. Misc. Colls., Quart. Iss., lii, 265, 1909.

Wyeomyia labesba Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iii, 106, 1915.

Wyeomyia incana Dyar, Ins. Ins. Mens., x, 189, 1922.

Wyeomyia (Wyeomyia) scotinomus Dyar & Knab.

Phoniomyia scotinomus Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 209, 1907.

Wyeomyia dymodora Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 68, 1908.

Wyeomyia (———) homothe Dyar & Knab.

Wyeomyia homothe Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 211, 1907.

The male is unknown.

Wyeomyia (Wyeomyia) rOLONCA Dyar & Knab.

Wyeomyia rOLONCA Dyar & Knab, Proc. Ent. Soc. Wash., xi, 173, 1910.

The female is unknown. This may be the male of *homothe*.

Wyeomyia (———) simmsi Dyar & Knab.

Phoniomyia simmsi Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 65, 1908.

The male is unknown.

Wyeomyia (Wyeomyia) rOLONCETTA Dyar.

Wyeomyia rOLONCETTA Dyar, Ins. Ins. Mens., vii, 131, 1919.

The female is unknown. This may be the male of *simmsi*.

Wyeomyia (Pentemyia) bromeliarum Dyar & Knab.

Wyeomyia bromeliarum Dyar & Knab, Proc. Biol. Soc. Wash., xix, 138, 1906.

Wyeomyia espartana Dyar & Knab, Proc. Biol. Soc. Wash., xix, 140, 1906.

Wyeomyia panamena Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 210, 1907.

Wyeomyia drapetes Dyar & Knab, Smiths. Misc. Colls., Quart. Iss., lii, 264, 1909.

Wyeomyia (Menolepis) culebrae Dyar.

Wyeomyia (Menolepis) culebrae Dyar, Ins. Ins. Mens., xi, 65, 1923.

Goeldia (Isostomyia) homotina Dyar & Knab.

Phoniomyia homotina Dyar & Knab, Proc. Biol. Soc. Wash., xix, 141, 1906.

Lesticocampa dicellaphora Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iii, 166, 1915.

Goeldia (Isostomyia) espini Martini.

Lesticocampa espini Martini, Ins. Ins. Mens., ii, 65, 1914.

Trichoprosopon (Joblotia) shropshirei Ludlow, Psyche, xxvi, 168, 1920.

Goeldia (Goeldia) lampropus Howard, Dyar & Knab.

Lesticocampa lampropus Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iii, 167, 1915.

Goeldia (Goeldia) leucopus Dyar & Knab.

Lesticocampa leucopus Dyar & Knab, Proc. Biol. Soc. Wash., xix, 137, 1906.

Goeldia (Goeldia) longipes Fabricius.

Culex longipes Fabricius, Syst. Antliat., 34, 1805.

Lesticocampa ulopus Dyar & Knab, Proc. Biol. Soc. Wash., xix, 137, 1906.

Lesticocampa culicivora Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 207, 1907.

Doctor Bonne says that two species are represented, having larval differences. Reëxamination of the material before me shows that the published figure of *culicivora* is in error, the comb being really a patch of scales as described by Doctor Bonne and not of a few scales as figured.

Joblotia digitatus Rondani.

Culex digitatus Rondani, Baudi e Truqui, Stud. Ent., 109, 1848.

Trichoprosopon nivipes Theobald, Mon. Culic., ii, 285, 1901.

Trichoprosopon wilsoni Ludlow, Psyche, xxv, 66, 1918.

Joblotia trichorryes Dyar & Knab.

?*Trichoprosopon compressum* Theobald, Mon. Culic., iv, 590, 1907.

Joblotia trichorryes Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 206, 1907.

Joblotia mogilasia Dyar & Knab.

Joblotia mogilasia Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 206, 1907.

This differs from *trichorryes* only in the different vestiture of the clypeus. Mr. Busck found three pupae in bamboo-joints at Tabernilla in 1907, and no other occurrence is of record. Tabernilla is now sixty feet under water and all the bamboo is destroyed.

Lutzia allostigma Howard, Dyar & Knab.

Lutzia allostigma Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iii, 471, 1915.

Culex (Culex) corniger Theobald.

Culex corniger Theobald, Mon. Culic., iii, 173, 1903.

Culex lactator Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 209, 1906.

Culex hassardii Grabham, Can. Ent., xxxviii, 167, 1906.

Culex basilicus Dyar & Knab, Proc. Biol. Soc. Wash., xix, 169, 1906.

Culex subfuscus Theobald, Mon. Culic., iv, 403, 1907.

Culex lactator loquaculus Dyar & Knab, Smith. Misc. Colls., Quart. Iss., lii, 254, 1909.

Culex leucotelus McCormack, Pan. Health Rep., 1918, 29, 1919.

Culex (Culex) coronator Dyar & Knab.

Culex coronator Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 215, 1906.

Culex ousqua Dyar, Ins. Ins. Mens., vi., 99, 1918.

Culex usquatatus Dyar, Ins. Ins. Mens., vi, 122, 1918.

Culex usquatissimus Dyar, Ins. Ins. Mens., x, 19, 1922.

Culex (Culex) declarator Dyar & Knab.

Culex declarator Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 211, 1906.

(Six synonyms of this species will be found listed in Ins. Ins. Mens., vi, 97, 1918.)

Culex (Culex) lepostenis Dyar.

Culex (Culex) lepostenis Dyar, Ins. Ins. Mens., xi, 70, 1923.

Culex (Culex) interrogator Dyar & Knab.

Culex interrogator Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 209, 1906.

Culex reflector Dyar & Knab, Smith. Misc. Colls., Quart. Iss., lii, 256, 1909.

The single slide of *reflector* shows an extra filament on the lobe of the side piece, which I now think is simply a variation.

Culex (Culex) chidesteri Dyar.

Culex chidesteri Dyar, Ins. Ins. Mens., ix, 117, 1921.

Culex (Culex) quinquefasciatus Say.

Culex quinquefasciatus Say, Journ. Acad. Nat. Sic. Phil., iii, 10, 1823.

Culex fatigans Wiedemann, Auss. Zweifl. Ins., i, 10, 1828.

Culex cubensis Bigot, Hist. Fisc. Ins. Cuba, vii, 329, 1856.

Culex penafeli Williston, La Nat., vii, 326, 1887.

Culex aikenii Dyar & Knab (not Aiken), Proc. U. S. Nat. Mus., xxxv, 61, 1908.

Culex revocator Dyar & Knab, Smith. Misc. Colls., Quart. Iss., lii, 256, 1909.

Culex lachrimans Dyar & Knab, Smith. Misc. Colls., Quart. Iss., lii, 259, 1909.

Culex aseyehae Dyar & Knab, Ins. Ins. Mens., iii, 112, 1915.

Culex (Culex) nigripalpus Theobald.

Culex nigripalpus Theobald, Mon. Culic., ii, 322, 1901.

Culex palus Theobald, Mon. Culic., iii, 194, 1903.

Culex factor Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 212, 1906.

Trichopronomyia microannulata Theobald, Mon. Culic., iv, 481, 1907.

Culex proximus Dyar & Knab, Proc. Ent. Soc. Wash., xi, 38, 1909.

Culex carabeus Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iii, 257, 1915.

Culex (Culex) mollis Dyar & Knab.

Culex carmodyae mollis Dyar & Knab, Proc. Biol. Soc. Wash., xix, 171, 1906.

(Four synonyms of this species will be found listed in Ins. Ins. Mens., ix, 29, 1921.)

Culex (Culex) inflictus Theobald.

Culex inflictus Theobald, Mon. Culic., ii, 115, 1901.

Culex scholasticus Theobald, Mon. Culic., ii, 120, 1901.

Culex extricator Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 211, 1906.

Culex (Micraedes) corrigani Dyar & Knab.

Culex corrigani Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 203, 1907.

Culex chalcocorystes Martini, Ins. Ins. Mens., ii, 70, 1914.

Culex (Anoediopora) bifolius Dyar.

Culex (Isostomyia) bifolius Dyar, Ins. Ins. Mens., x, 94, 1922.

Culex (Tinolestes) latisquama Coquillett.

Tinolestes latisquama Coquillett, Proc. Ent. Soc. Wash., vii, 185, 1906.

Culex (Helcopora) menytes Dyar.

Culex (Helcopora) menytes Dyar, Ins. Ins. Mens., vi, 125, 1918.

Culex (Melanoconion) spissipes Theobald.

Melanoconion spissipes Theobald, Mon. Culic., iii, 242, 1903.

Culex fur Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 13, 1907.

Culex (Melanoconion) dunni Dyar.

Culex (Melanoconion) dunni Dyar, Ins. Ins. Mens., vi, 123, 1918.

Culex (Melanoconion) zeteci Dyar.

Culex (Melanoconion) zeteci Dyar, Ins. Ins. Mens., vi, 123, 1918.

Culex (Gnophodeomyia) panocossa Dyar.

Culex (Melanoconion) panocossa Dyar, Ins. Ins. Mens., xi, 120, 1923.

Culex (Choeropora) egcymon Dyar.

Culex (Chorropora) egcymon Dyar, Ins. Ins. Mens., xi, 67, 1923.

Culex (Choeroporpa) taeniopus Dyar & Knab.

Culex taeniopus Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 100, 1907.

Melanoconion chrysothorax Peryassú, Os Culic. do Brazil, 244, 1908.

Culex (Choeroporpa) psatharus Dyar.

Culex (Choeroporpa) psatharus Dyar, Ins. Ins. Mens., viii, 173, 1920.

Culex (Choeroporpa) epanastasis Dyar.

Culex (Choeroporpa) epanastasis Dyar, Ins. Ins. Mens., x, 191, 1922.

Culex (Choeroporpa) conspirator Dyar & Knab.

Culex conspirator Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 207, 1906.

Culex (Choeroporpa) dysmathes Dyar & Ludlow, Ins. Ins. Mens., ix, 47, 1921.

Culex (Choeroporpa) pasadaemon Dyar, Ins. Ins. Mens., ix, 100, 1921.

Culex (Choeroporpa) elevator Dyar & Knab.

Culex elevator Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 217, 1906.

Culex apateticus Howard, Dyar & Knab (in part), Mosq. No. & Cent. Am. & W. I., iii, 321, 1915.

Culex (Choeroporpa) tecmarsis Dyar.

Culex (Choeroporpa) tecmarsis Dyar, Ins. Ins. Mens., vi, 124, 1918.

Culex (Choeroporpa) leprincei Dyar & Knab.

Culex leprincei Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 202, 1907.

(Seven synonyms of this species will be found listed in Ins. Ins. Mens., xi, 119, 1923.)

Culex (Choeroporpa) mutator Dyar & Knab.

Culex mutator Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 216, 1906.

Culex (Choeroporpa) alfaroi Dyar, Ins. Ins. Mens., ix, 34, 1921.

Culex (Choeroporpa) aneles Dyar & Ludlow.

Culex (Choeroporpa) aneles Dyar & Ludlow, The Mil. Surg., 1, 63, 1922.

Culex (Choeroporpa) educator Dyar & Knab.

Culex educator Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 217, 1906.

Culex apateticus Howard, Dyar & Knab (in part), Mosq. No. & Cent. Am. & W. I., iii, 321, 1915.

Culex (Choeroporpa) vaxus Dyar, Ins. Ins. Mens., viii, 73, 1920.

Culex (Choeroporpa) iolambdis Dyar.

Culex (Choeroporpa) iolambdis Dyar, Ins. Ins. Mens., vi, 106, 1918.

Culex (Choeroporpa) chrysonotum Dyar & Knab.

Culex chrysonotum Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 57, 1908.

Culex (Mochlostyrax) pilosus Dyar & Knab.

Mochlostyrax pilosus Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 224, 1906.

Culex (Mochlostyrax) hesitator Dyar & Knab.

Culex hesitator Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 205, 1907.

Culex (Carrollia) secunda Bonne-Wepster & Bonne.

Culex (Carrollia) secunda Bonne-Wepster & Bonne, Ins. Ins. Mens., vii, 170, 1920.

Culex (Microculex) jenningsi Dyar & Knab.

Culex jenningsi Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 204, 1907.

Culex jenningsi var. *gaudeator* Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 204, 1907.

Culex (Microculex) daumastocampa Dyar & Knab.

Culex daumastocampa Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 58, 1908.

Deinocerites spanius Dyar & Knab.

Dinanamesus spanius Dyar & Knab, Smith. Misc. Colls., Quart. Iss., lii, 259, 1909.

Deinocerites melanophylum Dyar & Knab.

Deinocerites melanophylum Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 200, 1907.

Deinocerites pseudus Dyar & Knab.

Deinocerites pseudus Dyar & Knab, Smith, Misc. Colls., Quart. Iss., lii, 260, 1909.

Deinocerites epitedeus Knab.

Dinomimetes epitedeus Knab, Journ. N. Y. Ent. Soc., xv, 120, 1907.

Mansonia titillans Walker.

Culex titillans Walker, Cat. Brit. Mus., Dipt. i, 5, 1848.

Taeniorhynchus flaveolus Coquillett, Proc. Ent. Soc. Wash., vii, 182, 1906.

Mansonia nigricans Coquillett.

Taeniorhynchus nigricans Coquillett, Proc. Ent. Soc. Wash., vi, 166, 1904.

Bancroftia persephassa Dyar & Knab, Smith, Misc. Colls., Quart. Iss., lii, 254, 1909.

Mansonia arribalzagae Theobald.

Taeniorhynchus arribalzagae Theobald, Mon. Culic., iii, 261, 1903.

Taeniorhynchus coticula Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 101, 1907.

Mansonia fasciolatus Lynch Arribalzaga.

Taeniorhynchus fasciolatus Lynch Arribalzaga, Rev. Mus. de La Plata, ii, 150, 1891.

Psorophora (Psorophora) lineatus Humboldt.

Culex lineatus von Humboldt, Voy. Reg. Equin., vii, 119, 1820.

Psorophora sacra Dyar & Knab, Proc. Biol. Soc. Wash., xix, 133, 1906.

Psorophora genumaculatus Peryassú, Os Culic. do Brazil, 161, 1908.

Psorophora blanchardi Surcouf & Gonzales Rincones, Ess. Dipt. Vul. Venez., 120, 1911.

Psorophora (Psorophora) cilipes Fabricius.

Culex cilipes Fabricius, Syst. Antliat., 34, 1805.

Sabethes scintillans Walker, Cat. Brit. Mus., Dipt., i, 1, 1848.

Psorophora iracunda Dyar & Knab, Proc. Biol. Soc. Wash., xix, 133, 1906.

Psorophora (Janthinosoma) ferox Humboldt.

Culex ferox von Humboldt, Voy. Reg. Equin., vii, 119, 1820.

Culex posticatus Wiedemann, Dipt. Exot., i, 43, 1821.

Janthinosoma oblitus Lynch Arribalzaga, Rev. Mus. de La Plata, ii, 154, 1891.

Janthinosoma echinata Grabham, Can. Ent., xxxviii, 311, 1906.

Janthinosoma vanhalli Dyar & Knab, Proc. Biol. Soc. Wash., xix, 134, 1906.

Janthinosoma coquillettii Theobald, Mon. Culic., iv, 157, 1907.

Janthinosoma centrale Brethes, Bol. Inst. Ent. y Pat. Veg., i, 20, 1912.

Psorophora (Janthinosoma) lutzii Theobald.

Janthinosoma lutzii Theobald, Mon. Culic., i, 257, 1901.

Janthinosoma albipes Theobald, Mon. Culic., iv, 157, 1907.

Psorophora (Janthinosoma) champerico Dyar & Knab.

Janthinosoma champerico Dyar & Knab, Proc. Biol. Soc. Wash., xix, 134, 1906.

?*Aedes horridus* Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 56, 1908.

Psorophora (Grabhamia) cingulatus Fabricius.

Culex cingulatus Fabricius, Syst. Antliat., 36, 1805.

Culex apicalis Theobald (not Adams), Mon. Culic., iii, 171, 1903.

Janthinosoma indoctum Dyar & Knab, Proc. Biol. Soc. Wash., xix, 161, 1906.

Culex neoapicalis Theobald, Mon. Culic., v, 336, 1910.

Aedes (Ochlerotatus) fulvus Wiedemann.

Culex fulvus Wiedemann, Auss. Zweifl. Ins., i, 546, 1828.

Culex ochripes Macquart, Dipt. Exot., Suppl. 4, i, 315, 1850.

Culex flavicosta, Walker, Ins. Saund., 431, 1856.

Culex bimaculatus Coquillett, Proc. U. S. Nat. Mus., xxv, 84, 1902.

Aedes (Ochlerotatus) trivittatus Coquillett.

Culex trivittatus Coquillett, Journ. N. Y. Ent. Soc., x, 193, 1902.

Culex inconspicuus Grossbeck, Ent. News, xv, 333, 1904.

Aedes angustivittatus Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 9, 1907.

Aedes cuneatus Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 54, 1908.

Aedes argentescens Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 55, 1908.

Aedes (Ochlerotatus) scapularis Rondani.

Culex scapularis Rondani, Studi Ent. Baudi e Truqui, 109, 1848.

Ochlerotatus confirmatus Lynch Arribalzaga, Rev. Mus. de La Plata, ii, 146, 1891.

Aedes hemisurus Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 199, 1908.

Aedes indolens Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 11, 1907.

Aedes (*Ochlerotatus*) *camposanus* Dyar, Ins. Ins. Mens., vi, 128, 1918.

Aedes (Ochlerotatus) serratus Theobald.

Culex serratus Theobald, Mon. Culic., ii, 45, 1901.

Aedes meridionalis Dyar & Knab, Journ. N. Y., Ent. Soc., xiv, 195, 1906.

Aedes (Ochlerotatus) nubilus Theobald.

Culex nubilus Theobald, Mon. Culic., iii, 208, 1903.

Aedes pertinax Grabham, Can. Ent., xxxviii, 316, 1906.

Protoculex quasiterratus Theobald, Mon. Culic., iv, 465, 1907.

Aedes polyagrus Dyar, Ins. Ins. Mens., vi, 77, 1918.

Aedes (Ochlerotatus) hastatus Dyar.

Aedes (*Ochlerotatus*) *hastatus* Dyar, Ins. Ins. Mens., x, 160, 1922.

Aedes (Taeniorhynchus) taeniorhynchus Wiedemann.

Culex taeniorhynchus Wiedemann, Dipt. Exot., 43, 1821.

Culex damnosus Say, Journ. Acad. Nat. Sci. Phil., iii, 11, 1823.

Taeniorhynchus niger Giles (not *Aedes niger* Theobald, 1901), Journ. Trop. Med., vii, 382, 1904.

Culex portoricensis Ludlow, Can. Ent., xxxvii, 386, 1905.

Aedes epinotus Dyar & Knab, Ins. Ins. Mens., ii, 61, 1914.

Aedes (Taeniorhynchus) fluviatilis Lutz.

Culex fluviatilis Lutz in Bourroul, Mosq. do Brasil, 72, 1904.

Danielsia medimaculata Theobald, Mon. Culic., iv, 245, 1907.

Danielsia tripunctata Theobald, Mon. Culic., iv, 247, 1907.

Aedes lithoecctor Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 201, 1907.

Aedes zoösofhus Dyar & Knab, Ins. Ins. Mens., v, 165, 1918.

Aedes (Finlaya) terreus Walker.

Culex terreus Walker, Ins. Saund., 429, 1856.

Hæmagogus oswaldi Lutz in Bourroul, Mosq. do Brasil, 66, 1904.

Verrallina insolita Coquillett, Can. Ent., xxxviii, 62, 1906.

Verrallina laternaria Coquillett, Proc. Ent. Soc. Wash., vii, 184, 1906.

Aedes (Finlaya) thorntoni Dyar & Knab.

Aedes thorntoni Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 10, 1907.

Aedes (Stegomyia) aegypti Linnaeus.

Culex aegypti Linnaeus, Hass. Pal. Reise, 470, 1762.

(Twenty-five synonyms of this species will be found listed in Ins. Ins. Mens., viii, 182, 1920.)

Haemagogus (Stegoconops) leucomelas Lutz.

Haemagogus leucomelas Lutz in Bourroul, Mosq. do Brasil, 66, 1904.

Haemagogus (Stegoconops) equinus Theobald.

Haemagogus equinus Theobald, Entom., 282, 1903.

Haemagogus capricornii Lutz in Bourroul, Mosq. do Brasil, 66, 1904.

Aedes philosophicus Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 190, 1906.

Aedes affirmatus Dyar & Knab, Proc. Biol. Soc. Wash., xix, 164, 1906.

Haemagogus spegazzinii Brethes, Bol. Inst. Ent. y. Pat. Veg., i, 39, 1912.

Haemagogus (Haemagogus) lucifer Howard, Dyar & Knab.

Stegoconops lucifer Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., ii, Pl. 23, fig. 164, 1912.

Haemagogus (Haemagogus) argyromeris Dyar & Ludlow.

Haemagogus argyromeris Dyar & Ludlow, The Mil. Surg., xlviii, 670, 1921.

Haemagogus (Haemagogus) gladiator Dyar.

Haemagogus gladiator Dyar, Ins. Ins. Mens., ix, 108, 1921.

Haemagogus (Haemagogus) chalcospilans Dyar.

Haemagogus chalcospilans Dyar, Ins. Ins. Mens., ix, 110, 1921.

Orthopodomyia fascipes Coquillett.

Mansonia fascipes Coquillett, Proc. Ent. Soc. Wash., vii, 182, 1905.

Mansonia longipalpis Newstead & Thomas, Ann. Trop. Med. & Par., iv, 145, 1910.

Orthopodomyia phyllozoa Dyar & Knab.

Mansonia phyllozoa Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 199, 1907.

Megarhinus superbus Dyar & Knab.

Megarhinus superbus Dyar & Knab, Smith, Mis. Colls., Quart. Iss., xlviii, 255, 1906.

Megarhinus hypoptes Knab.

Megarhinus hypoptes Knab, Can. Ent., xxxix, 50, 1907.

Allied to *trinidadensis* D. & K. of South America, and like it in male genital structure, but differing in the coloration of the male hind tarsi.

Megarhinus moctezuma Dyar & Knab.

Megarhinus moctezuma Dyar & Knab, Smith, Mis. Colls., Quart. Iss., xlviii, 251, 1906.

Uranotaenia geometrica Theobald.

Uranotaenia geometrica Theobald, Mon. Culic., ii, 247, 1901.

Uranotaenia calosomata Dyar & Knab.

Uranotaenia calosomata Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 200, 1907.

Uranotaenia typhlosomata Dyar & Knab.

Uranotaenia typhlosomata Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 200, 1907.

Uranotaenia lowii Theobald.

Uranotaenia lowii Theobald, Mon. Culic., ii, 339, 1901.

Uranotaenia continentalis Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 187, 1906.

Uranotaenia minuta Theobald, Mon. Culic., iv, 559, 1907.

Aëdeomyia squamipennis Lynch Arribalzaga.

Aedes squamipennis Lynch Arribalzaga, El Nat. Argent., i, 151, 1878.

Anopheles argyritarsis Robineau-Desvoidy.

Anopheles argyritarsis Robineau-Desvoidy, Mem. Sec. d'Hist. Nat., iii, 411, 1827.

Anopheles albimanus Wiedemann.

Anopheles albimanus Wiedemann, Dipt. Exot., 10, 1821.

Anopheles cubensis Agramonte, El Prog. Med., x, 460, 1900.

Anopheles argyrotarsis albipes Theobald, Mon. Culic., i, 125, 1901.

Anopheles dubius Blanchard, Les Moust., 205, 1905.

Anopheles tarsimaculata Goeldi.

Anopheles tarsimaculata Goeldi, Os Mosq. no Para, 133, 1905.

Anopheles gorgasi Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 198, 1907.

Cellia oswaldoi Peryassú, Pinto, Anoph. de Angra dos Reis, 14, note (pasted), 1923.

Anopheles neivai Howard, Dyar & Knab.

Anopheles neivai Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iv, 986, 1917.

This is probably only a local form of *bellator* D. & K.

Anopheles punctimacula Dyar & Knab.

Anopheles punctimacula Dyar & Knab, Proc. Biol. Soc. Wash., xix, 136, 1906.

Anopheles malefactor Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 198, 1907.

Anopheles apicimacula Dyar & Knab.

Anopheles apicimacula Dyar & Knab, Proc. Biol. Soc. Wash., xix, 136, 1906.

Anopheles eiseni Coquillett.

Anopheles eiseni Coquillett, Journ. N. Y. Ent. Soc., x, 192, 1902.

Myzomyia tibiamaculata Neiva, Brazil-Med., xx, 288, 1906.

Anopheles (Stethomyia?) niveopalpis Ludlow, Psyche, xxvi, 166, 1920.

Anopheles pseudopunctipennis Theobald.

Anopheles pseudopunctipennis Theobald, Mon. Culic., ii, 305, 1901.

Anopheles franciscanus McCracken, Ent. News, xv, 12, 1904.

Anopheles peruvianus Tamayo, Mem. Munic. Lima, xxxv, 1907.

Proterorhynchus argentinus Brethes, Bol. Inst. Ent. y Pat. Veg., i, 15, 1912.

Anopheles tucumanus Lahille, An. Mus. Nac. B. A., xxiii, 253, 1912.

Anopheles nimba Theobald.

Stethomyia nimba Theobald, Mon. Culic., iii, 62, 1903.

Omitting the names of those forms which are doubtfully the sexes of others, this list contains 128 species. Doctor and Mrs. Bonne give 135 species found by them in Surinam (Ins. Ins. Mens., xi, 123-127, 1923), and it thus seems probable

that 130 species is about the number of mosquitoes that may be expected to occur in one tropical American region. In the case of Panama, it is possible that the list will be extended by further collecting, but I think not to any great extent. Superfluous synonymy has been already pretty thoroughly eliminated. Mr. Busck published a list of Panama mosquitoes, including those taken by himself and otherwise recorded (Smith. Misc. Colls., Quart. Iss., lii, 49-77, 1908), in which he records 89 species. Some of these were not taken by Mr. Busck himself, and others in the list have since been reduced to synonymy, so that the actual number of species collected by Mr. Busck at that time amounts to 76 species, from the records in the National Museum collection. This excellent start has been built upon for fifteen years, until the present record has been established.

A NEW CULEX FROM MEXICO

(*Diptera, Culicidae*)

By HARRISON G. DYAR

A species of *Culex* of the *salinarius* group occurs in the Federal District about Mexico City. The specimens have been received from time to time through Sr. A. L. Herrera, but always in such poor condition that it has seemed undesirable to attempt description. Recently, however, a long series has come from Sr. Regino Balanzario, a medical student, who desires a determination for use in his thesis. These specimens are in no better shape—they are completely denuded—but some males are included which are distinct on genitalic characters. The following description is offered, based on the male genitalia:

Culex federalis, new species.

Lobe of side piece with three rods, a hooked filament, a leaf and a seta. Tenth sternites with the outer spines thick and tooth-like, the basal arm long and completely recurved. Mesosome with two arms and denticles between, the tooth from the base wide and shortly projecting, indistinct, its origin not

traceable; outer arm tooth-like, strongly widening below apex, the widening forming a shoulder; lower arm tooth-like, moderate; denticles numerous, filling the space between the arms, somewhat curved, the upper ones next the outer arm small.

Types, two males, mounted out of a series of 158 specimens of both sexes, Xochimilco, D. F., Mexico, presumably collected in the summer of 1923 (R. Balanzario, through A. L. Herrera).

ON SOME OF THE AMERICAN SUBGENERA OF CULEX

(Diptera, Culicidae)

By HARRISON G DYAR

In this magazine (Ins. Ins. Mens., vi, 92, 1918) I recognized a number of subgenera of *Culex*, of which reference is here had particularly to *Micraedes*, *Melanoconion* and *Isostomyia*. The latter name I have shown (Ins. Ins. Mens., xi, 82, note, 1923) is not properly applicable to a subgenus of *Culex*, but rather to a group of *Goeldia*. Further study and more extensive material has induced me to propose the following regrouping:

Clasper simple, slender beyond the enlarged base.

Lobes of side-piece apart.....*Melanoconion*

Lobes of side-piece united and reduced.....*Micraedes*

Clasper simple, thick, narrowed on terminal third.

Lobes of side-piece apart, but joined on a common stem to base,

Gnophodomyia

Lobes of side-piece united and reduced.....*Tinolstes*

Lobe a single long arm, followed by very large setae.....*Eubonnea*

Clasper simple, bent near the middle at right angles or nearly so.*Aedinius*

Clasper modified at tip.

Tip obliquely elliptically excavate or branched.....*Helcoporpa*

Tip swollen with snout-like termination.....*Choeroporpa*

Tip swollen, subspherical.....*Mochlostyrax*

***Culex (Melanoconion) atratus* Theobald.**

The type of the subgenus. The male hypopygium is shown on Plate XI, figure 10.

Culex (Melanoconion) zeteci Dyar.

The hypopgium is similar to that of *atratus*, the inner division of the lobe of side-piece is strongly developed (Pl. XI, fig. 11).

Culex (Melanoconion) dunni Dyar.

In this form the transparent plate at base of side-piece is excavated and forms a blade-like arm (Pl. XI, fig. 12). The *ensiformis* of Bonne-Wepster & Bonne is identical, as far as my limited material shows.

Culex (Melanoconion) commevynensis Bonne-Wepster & Bonne.

The figure (Pl. XI, fig. 16) is from a sketch kindly made for me by Dr. C. Bonne. The outer division of the lobe of side-piece is strongly developed and supplemented by a large flattened seta.

Culex (Melanoconion) spissipes Theobald.

This figure (Pl. XI, fig. 17) also was made by Dr. Bonne. The palpi of the male exceed the proboscis as in all the species here referred to *Melanoconion*.

Culex (Micraëdes) bisulcatus Coquillett.

The species is figured here for comparison (Pl. X, fig. 5). The palpi of the male are only one-third as long as the proboscis.

Culex (Gnophodeomyia) aikenii Aiken.

In this peculiar form, the divisions of the lobe of the side-piece are united and partly separated from the lobe itself nearly to the base (Pl. XI, fig. 13). The palpi of the male exceed the proboscis.

Culex (Gnophodeomyia) panocossa Dyar.

Perhaps a geographical race of the preceding. The differences in the structures, while considerable, are relative only (Pl. XI, fig. 14).

Culex (Tinolestes) latisquama Coquillett.

This also is redrawn for comparison (Pl. X, fig. 6). The palpi of the male are only half as long as the proboscis.

Culex (Eubonnea) tapena Dyar.

By comparing the present figure (Pl. XI, fig. 15) with that of *Culex (Carrollia) paraplesia* from Colombia (Ins. Ins. Mens., x, Pl. V, fig. 6, 1922), it will be seen that they are practically identical. It is probable that they are synonymous. Perhaps *Eubonnea* should not be separated subgenerically from *Carrollia*. The palpi of the male are short in the present species, longer than the proboscis in *Carrollia* proper.

Culex (Aëdinus) originator Gordon & Evans.

The figure (Pl. XI, fig. 18) is redrawn from that of Gordon & Evans (Ann. Trop. Med. & Par., xvi, 324, 1922). The palpi of the male are short, and the species must be close to, if not the same as *Aëdinus amazonensis* Lutz, the type of *Aëdinus*.

Culex (Aëdinus) conservator Dyar & Knab.

The clasper is bent at right-angles and is hairy without (Pl. X, fig. 2). The palpi of the male are short.

Culex (Aëdinus) bifoliatus Dyar.

Similar to the preceding (Pl. X, fig. 3), with greater development in detail of the divisions of the lobes of the side-piece. The palpi of the male are short.

Culex (Aëdinus) corrigani Dyar & Knab.

The clasper is less strongly bent and less hairy without (Pl. X, fig. 4). The divisions of the lobe of side-piece are reduced. The palpi of the male are short.

Culex (Aëdinus) homocopas Dyar & Ludlow.

Agreeing in the structure of the clasper with *conservator* and *bifoliatus*, the divisions of the lobe of side-piece remarkably developed (Pl. X, fig. 1), but the palpi of the male exceed the proboscis.

Culex (Aëdinus) restrictor Dyar & Knab.

The clasper is still less strongly bent than in *corrigani* and the lobes of the side-piece are not unlike it (Pl. X, fig. 7), but the palpi of the male are long, exceeding the proboscis. The

shortening of the male palpi is thus seen not to be parallel with the hypopygial structures.

Culex (Helcoporpa) menytes Dyar.

The type of the subgenus is shown in the figure (Pl. X, fig. 8). The ninth tergites are well developed, conical, *setose*. The palpi of the male exceed the proboscis.

Culex (Helcoporpa) trifidus Dyar.

There is no particular relationship in the structure of the clasper of this species with the preceding (Pl. X, fig. 9), but it seems scarcely worth while to erect a subgenus upon it. The ninth tergites are completely undeveloped. The palpi of the male exceed the proboscis.

Since the foregoing was written I have seen an article by Miss A. M. Evans (Ann. Trop. Med. & Par., xvii, 377, 1923) in which she identifies as *Aedinus amazonensis* Lutz a male with short palpi which she finds to agree better with Lutz's description than *Culex originator* does. This male is close to *Culex (Carrollia) paraplesia* Dyar. I think that Miss Evans' supposition is very plausible, and I will, temporarily at least, adopt it, with the following synonymy:

Culex (Aedinus) amazonensis Lutz.

Aedinus amazonensis Lutz, Imp. Med., Mar 25, 1905.

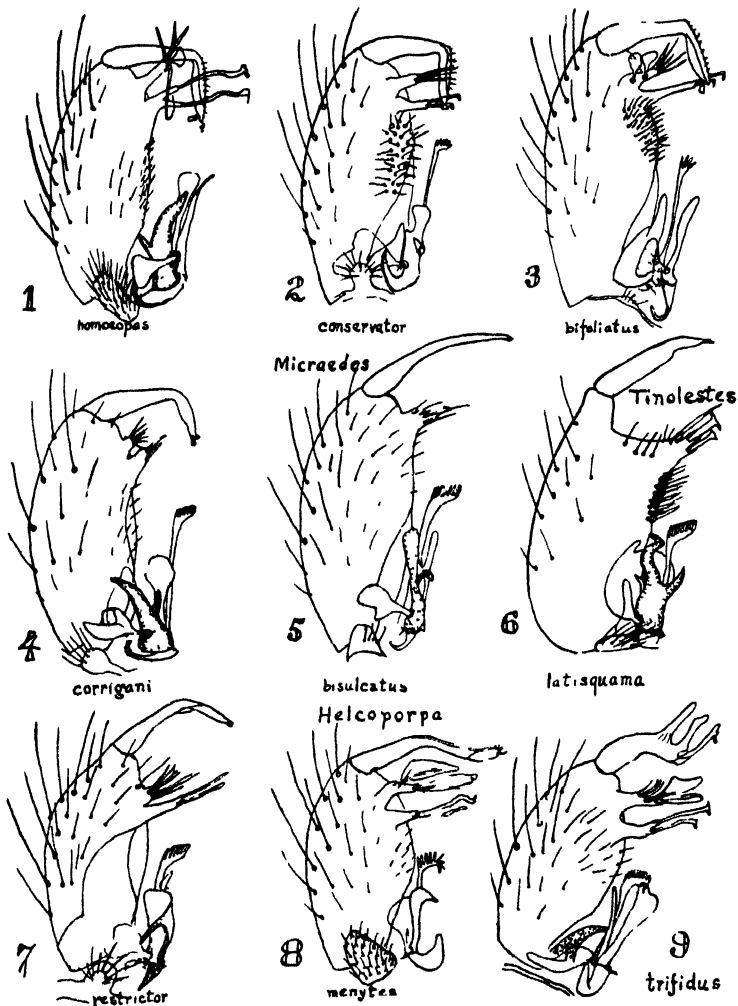
Culex (Eubonnea) tapena Dyar, Ins. Ins. Mens., vii, 150, 1919.

Culex (Carrollia) paraplesia Dyar, Ins. Ins. Mens., x, 192, 1922.

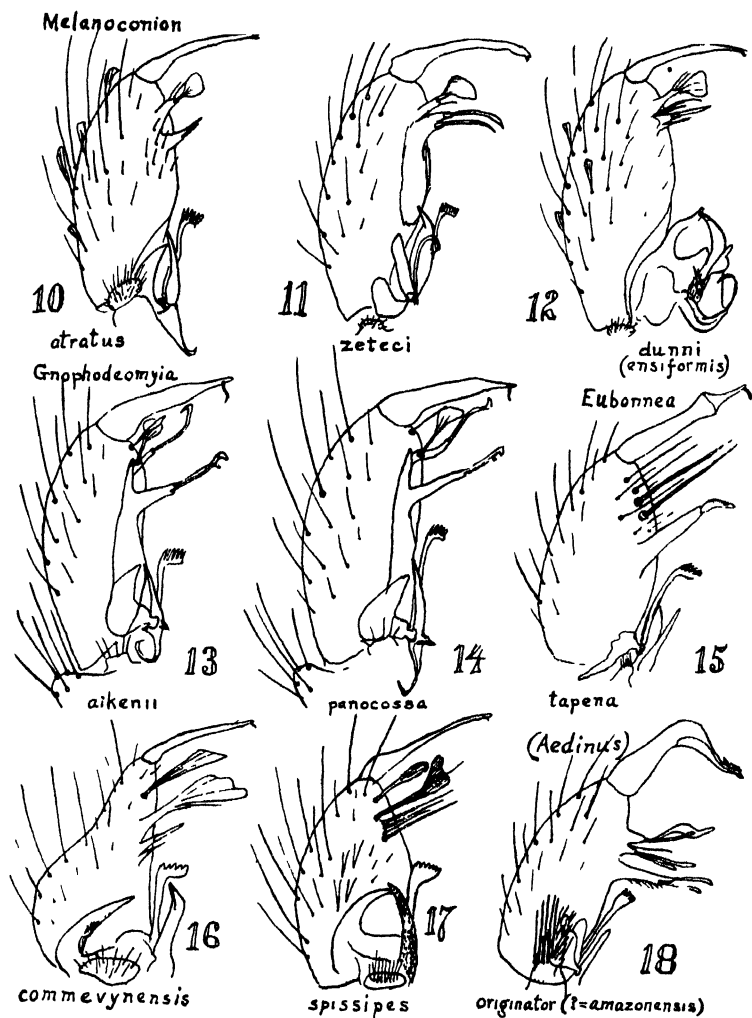
Culex hildebrandi Evans, Ann Trop. Med. & Par., xvii, 377, 1923.

The differences noted by Miss Evans between her specimen and my description of *paraplesia* are due to variation in the number of teeth of the tenth sternites or to some of them being concealed in the mount, while the ninth tergites were overlooked by me. They are correctly described under *tapena*.

This identification of *Aedinus* invalidates the one used by me in the foregoing. *Aedinus* will replace *Eubonnea*, while for the group called *Aedinus* by me, the new name *Anoedioporpa* is proposed, with type *conservator* D. & K.



MALE GENITALIA OF CULEX



MALE GENITALIA OF CULEX

A REMARKABLE WINGLESS GLOW-WORM FROM ECUADOR

(*Coleoptera, Lampyridae*)

By H. S. BARBER

Professor F. Campos R., of Guayaquil, has kindly submitted specimens of a large glow-worm found at three stations in Ecuador, viz., Angamarca, 3,000 meters altitude, Aloag, 2,920 meters altitude, and Pifo, 2,588 meters altitude, representing, respectively, a female, a large well preserved larva, and a smaller poorly preserved larva.

As the classification and identification of Lampyridae is based upon males, and for the present leaves us ignorant of the structures of the females and larvae of most genera, it has been very difficult to decide what generic name to use in recording the facts they offer.

The species is so large and so strongly colored that its male must be a conspicuous form and should be expected to display the same type of coloration (black legs and disc of pronotum, the latter with yellow side margins) as in the female and larva. A search of the literature on Andean Lampyrids for described species to which these specimens should be assigned has been very unsatisfactory in results, but in the genus *Phaenolis* a species having this coloration and collected at Belzapamba, Ecuador, has been described by Ernest Olivier (1907) under the name *Phaenolis abditus*.¹ The adoption of this name for the specimens here described is very uncertain, because species of several genera in which only males are as yet known will undoubtedly be found inhabiting the same region and only the rearing of adults from larvae and observation on the mating of the adults can corroborate or disprove the determination here offered.

The larger larva was kept under observation for eight days by Prof. Campos, who received it from Aloag, 2,920 meters

¹ The original description by E. Olivier (*Genera Insectorum*, fasc. 53, p. 10) is here freely translated: "*Phaenolis abditus*, n.sp.—Oblong, black; prothorax angulate in front, deeply punctate, longitudinally costulate, testaceous with disc black; scutellum triangular, black; elytra wider than prothorax, parallel, rugose, testaceous. Length 11 mm.—Ecuador; Belzapamba."—type in collection of Ern. Olivier.

altitude, in the Interandean region, about the end of May, 1922, and the following is freely translated from notes on its light which he was kind enough to supply.

"The photogenic apparatus consists of two bodies protruding from the articulation between the penultimate and the antepenultimate abdominal segments and occupying the sides of the latter. These organs emit a pale green phosphorescence of variable intensity; thanks to the pale and membranous areas of the dorsal integument, the animal is able to show its light above as well as below."

There is preserved in the National Collection a large (50 mm. long, 14 mm. wide) dried Chilian lampyrid larva from the collection of E. C. Reed bearing the label "*?Cladodes ater? ♀*." At first sight it appears similar except in color to the one received from Ecuador but it differs greatly in the thickness and shape of side margins and in the apical tuberculation of the abdominal sternites as well as in the structure of seventh, eighth and ninth abdominal segments. It is very dark brown above and below but the thick side margins of all tergites and the upper margin of the pleurites form a narrow yellow border which is incurved around the posterior angles of the thoracic tergites, broadly interrupted at middle of sides of pronotum (though present on the ventral surface) and broadened anteriorly into a pair of elongate oval yellow maculae at sides of front margin of pronotum. In all of its characters except those of its poorly preserved head it is more similar to the larva of *Pleotomus* than to other glow-worms known to me. In the absence of habitat data indicating the type of fauna in which this Chilian glow-worm was found I can only guess that it may be either the larva of the as yet undiscovered female of the genus *Calyptocephalus*, or that a very large *Pleotomus*-like male is yet to be discovered in Chili.

The following description and accompanying figures of the female and large larva from Ecuador may contribute to a better understanding of the interesting problems presented by this family.

?*Phaenolis additus* E. Oliv.? female (Pl. XII, fig. 1, 2, 3, 4).

Large, elongate, parallel, depressed, without vestige of elytra; color yellow throughout, except the black legs, antennae, head and disc of pronotum. Length, 35 mm.; width, 9 mm. (specimen dry and somewhat shriveled).

Locality, Angamarca, 3,000 meters altitude.

Head (somewhat collapsed and withdrawn into prothorax) black, front concave; mandibles (fig. 3) slender, prominent, simple, falciform, nearly straight in median half, more arcuate apically and basally, crossing obliquely upward. Antennae black, ten-jointed (fig. 2); basal joint large, flattened, elongate; second transverse, subglobular, nearly as wide as first; third narrower and shorter; fourth to eighth narrower, nearly as long as wide, base and apex oblique; ninth larger, tenth reduced to a mere vestige at apex of ninth. Maxillary palpi black, strongly inflated apically, 4-jointed, the joints subequal in length, last joint with large sensory area. Labial palpi small, 3-jointed. Legs rather strong, black, shining, well chitinized; tarsi (fig. 4) short, 5-jointed, with pair of stout but small claws. Pronotum seven-tenths as long as wide, sides and front margin evenly rounded, entirely concealing the head; base straight; anterior margin slightly reflexed; surface shining in black median area which is strongly narrowed in front; opaque in yellow areas, the latter occupying an arcuate, marginal area about one-fourth of the pronotal width in front and at base but about one-sixth the width at middle. Mesonotum, metanotum, and abdominal tergites feebly chitinized, uniformly yellow, feebly shining, margins slightly explanate. Eighth abdominal tergite rectangularly produced at apical angles, apex strongly bisinuate. Last sternite strongly bilobed, acutely, deeply notched at middle of apex in front of which it is more strongly chitinized and slightly infusate on each side of median line; and with lateral inflated paler area (luminous organs?). Sternites of five preceding segments paler and smoother at middle but extent of luminous organs not apparent.

?*Phaenolis additus*? larva (Pl. XII, figs. 5, 6, 7).

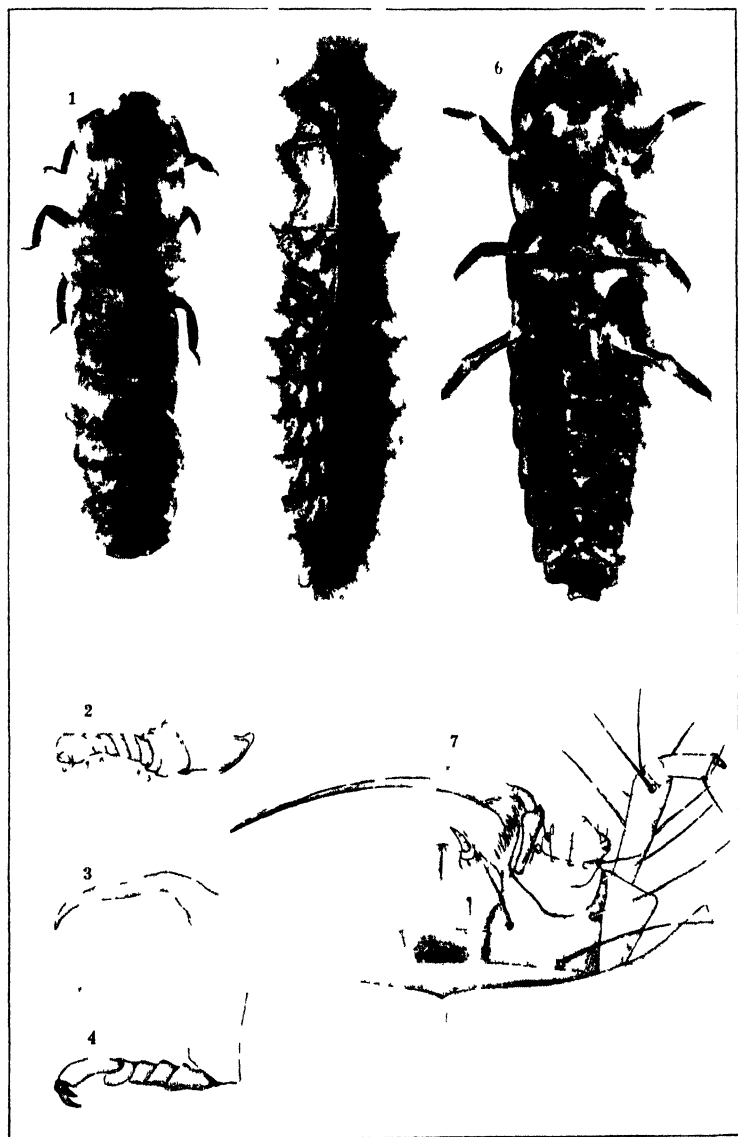
Large, depressed, sub-parallel, tapering posteriorly, strongly

chitinized, shining, black except orange side margins which are moderately explanate. Length (dry), 40 mm.; width, 11.4 mm.

Locality, Aloag, 2,920 meters altitude.

Head (withdrawn into prothorax) large; stipes strongly chitinized, shining, armed with four stiff setae, which are yellow at base; maxillary palpi stout, short, 4-jointed; labial palpi small, 2-jointed, last joint acute; mandibles very long and slender, very slightly curved except abrupt bend near base, under surface carinate in apical two-thirds. Pronotum wider than long, sides and front margin continuously, almost evenly arcuate, the latter vaguely emarginate at median suture hind angles broadly rounded, base straight; surface uneven, shining, coarsely irregularly foveolate except at middle, minutely shagreened laterally, black except two pair of confluent, elongate, marginal orange spots. Other tergites with similar sculpture and coloring except that lateral orange area on each consists of a single spot, narrow anteriorly, widest at apical third and that abdominal tergites 1-5 each displays a very small pair of approximate, median, longitudinal orange spots. Eighth, ninth and tenth segments damaged in specimen figured, the eighth with posterior margin feebly bisinuate, slightly rounded nearly right hind angles and pleurite inflated anteriorly into paler colored, photogenic organ; ninth tergite much narrower, subquadrate, emarginate, the pleurites produced posteriorly into a pair of polished, slightly divaricate tubercles; tenth segment ventral, transversely oval, very short.

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Insecutor Inscitiae Menstruus

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Insecutor Inscitiae Menstruus

Vol. XII

JANUARY-MARCH, 1924

Nos. 1-3

NOTES AND DESCRIPTIONS OF AUSTRALIAN CHALCID FLIES—I

(*Hymenoptera*)

By A. A. GIRAULT

The following species are herewith added to the Australian fauna; at the same time a few mistakes are corrected. Types in Queensland Museum.

Eurytoma capitaticornis, new species.

Black, wings clear, legs save coxae reddish brown, knees, tibial tips, tarsi yellow. Umbilicately punctate; middle of scutellum finely scaly. Cephalic third propleurum honey at ventral half (not visible from above) Distal half tegula brown. Funicle 1 nearly twice longer than wide, next three subglobose, 5 larger, a bit wider than long; flagellum capitate, club short, wider than funicle, half longer than wide. Marginal somewhat exceeding stigmal, latter subequal postmarginal. Petiole twice longer than wide. Propodeum rugulose, with a median channel composed of a fovea at base divided longitudinally, then cross-rugae rather close together. Abdomen 5 twice 4, half the surface, abdomen cylindrical. Middle mesopleurum finely obliquely lined.

Jungle, Cedar Creek, Queensland, October 3, 1921.

Chalcis bachi, new species.

Like description of *atrata* but pubescence not conspicuous, head all black, tibia 3 yellow at basal fifth above; tibial tips above, all knees very narrowly, disc of tegulae, lemon. Hind femur with seven teeth, 1 large, others small, decreasing in size. Postmarginal two-thirds longer than the short stigmal.

Funicle 1 subquadrate. Scrobes attaining cephalic ocellus. Cephalic part mesopleurum glabrous with several large punctures at cephalic margin; other, sunken part cross-striate. Two converging rugae across cheek (lateral aspect), one at edge of eye, other at apex of head, meeting at occipital margin caudad and forming the letter V on its side; the ventral one is more curved.

Mangrove swamp, Cairns, Queensland, January 23, 1919.

Ablerus albicaput, new species.

As *speciosus* Girault but ovipositor valves concolorous, funicle 2 a third longer than 1 or 4, no tuft on fore wing but about five short lines of coarse ciliation against distal half of marginal vein; a narrow, very oblique fuscous stripe from bend of submarginal; scape black beneath at distal half; cinctus of femur 1 ventrad only. Head ivory with a narrow dark band across a short distance below eyes.

Forest, Banyo, Queensland, December 1, 1921.

Epitetracnemus auricornis, new species.

From the genotype: Wings clear, veins pale, submarginal setae small, jaw 1 distinctly shorter than 2, minute, frons (prominent) moderately wide, ovipositor not extruded; hairless line closed from middle, ciliation proximad of it extending nearly to base and fine save 6-7 lines against venation at hairless line; club not so wide, a bit exceeding funicle; pedicel longer, dilation of scape greatest at middle, marginal slenderer. Dull purple and scaly, legs save coxae and femur 3, white; antennae save pedicel above, golden. Scutum with short, scattered yellowish hairs, on scutellum minute, resembling dust. Funicles 1-4 equal, over two times wider than long, 6 longer. Jaw 2 squarely truncate, not subacute next to 1 as in genotype.

Banyo, forest, December 1, 1921.

Chrysopophagus variocelli, new species.

As *purpureicinctus* Girault but ocelli in a triangle, lateral distinctly closer to eye than to cephalic and somewhat closer to cephalic than to each other (in other species, over twice further

apart than each is distant from cephalic); tibia 3 purple only along base above, femur 3 with an elongate purple stripe, proximal third to apex, dorsomesad.

Nelson, Queensland.

***Paraheydenia cristatipennis*, new species.**

From description of genotype: Fore wing with a dense tuft of black setae at break of submarginal vein (the "basal cloud" of Cameron?); postmarginal narrowing distad, half longer than stigmal; fore femur ventrad with margin angulated, 2 distinct, serrate margins, meeting distad of middle in an obtuse point, the proximal distinctly longer, whole occupying most of the ventral edge and guarded at each end by a larger tooth; another similar tooth between the distal one of the two and apex; upper margin femur 1 very convex. Parapsidal furrows distinct. Abdomen compressed (less so distad), produced at apex into a sharp stylus, segments not much unequal. Scrobes long, narrow, converging. Tibia 1 with a tooth beneath near base and a pair of smaller ones above just before tip.

Differs from *longicollis*: Tarsi white save 5; legs purple, reddish beneath. Most of femur 2 reddish; scape submetallic above; fore wing besides the truncate, wedge-shaped area from most of stigmal (not reaching half across), generally lightly infuscated between hair tuft and half way to the jet area; sculpture of head finer than that of thorax, scaly; scutellum with a small, obscure, raised, triangular area, mesal base; propodeum with a median carina which is forked at apex, no lateral, spiracle round, not large, central. Funicle 7 subquadrate, club 1 over half that region, subequal funicle 3, latter over twice longer than wide; antennae 13-jointed, one ring-, 3 club. Tibia 3 above with at least four thorn-like pale spines between base and apex.

Kuranda, Queensland, November, 1919 (A. P. Dodd).

***Euplectrus seminigrifemur*, new species.**

Black, wings clear; legs save coxa 3 and distal half femur 3 and antennae save last two funicles and the club, whitish; a bit over proximal half abdomen dorsad (segments 2 and 3, 2 long,

3 transverse) save all margins, golden. Head nearly glabrous, vertex with long bristles, also rest of dorsal thorax, excluding propodeum. Funicle 1 somewhat longer than wide, rest quadrate. Tegulae yellow.

Many females from a Sphingid larva, Nelson, Queensland, July (A. P. Dodd).

Dialulomyia arboris, new species.

As *floris* but hind tibia at basal fourth concolorous (same in *floris*) while the fore wing is infuscated to apex from near base of marginal, the infuscation accented in a deep crescent from stigmal knob, curving nearly to base of marginal; proximal half of this crescent thicker than the distal; nipple-like 3 of club shorter, paler and does not end in a distinct nipple. Upper face with a few pin punctures.

One female, forest, Wynnum, Queensland, September 27, 1921.

Ceratoneurella mediosulcata, new species.

Differs from genotype only in having abdominal petiole transverse. Lustrous black, wings clear, scape, knees, apex tibiae 1 and 2 widely, tip tibiae 3, funicle 1 (2 somewhat), petiole, reddish brown, tarsi whitish. Funicles slightly decreasing distad, half longer than wide, equal pedicel. Club nippleless. Mandible 3 shortest, blunt, 1 strong, acute. Upper face with pin punctures. Sculpture usual; minute setigerous punctures along lateral scutum, more densely on propleurum. Propodeum rugulose, with a pair of median carinae. An ovate fovea at ventral apex of eye. Ocelli in a curved line. Stigmal moderately long.

Male similar, funicle 1 shortest, quadrate, 2 equal club 1, twice longer than wide, 3-4 longest. Club 3 conical; 4 funicles, 3 ring-joints, scape thicker, with a distinct, circular bulge beneath toward apex, the flagellar joints (save pedicel), with a long, spreading brush of silky hairs from base, smaller on distal two.

Many specimens reared in late September, 1921, from large, reddish brown, velvety galls form the leaves of a forest bush, Wynnum, Queensland.

Buonapartea, new genus (Ceratoneurini).

Genotype: *Ceratoneurella rufobasalis* Girault. See original description.

Buonapartea aeniceps, new species.

Red, wings clear; head aeneous save for a yellow, subrectangular area from mouth to antennae; scape white, also apex of club slightly; abdomen margined narrowly with black. Vertex, scutum pin-punctate, setose, latter with one black bristle caudo-laterad. Funicle 1 a half longer than wide, club with a long spicule, exceeding pedicel, latter exceeding funicle 1. Antennae below middle of face, scutellum 4 bristles, stigmal short, propodeum with a median carina which forks at base. Scutellum with lateral grooves only, scutum simple.

Male black, head metallic, legs and basal half abdomen save margins widely, yellow brown. Otherwise as female but antennae honey, scape greatly convexly dilated, 4 funicles, 3 clubs, club conical, funicles somewhat unequal, subquadrate, from dorsad each with a whorl of very long hairs, latter reaching apex of club; pedicel subelongate, club 3 acute.

Many specimens, Babinda, Queensland, jungle, May, 1920, reared from puparium of a Tachinid fly (A. P. Dodd).

Procheiloneurus flaviscutellum, new species

Dull yellow, scutum green, abdomen save basal fifth purple, fore wing brown to apex from base of marginal (farther proximad midlongitudinally) save extreme apex and a narrow eye-spot at hind margin opposite and beyond apex of venation. Ovipositor one-fourth abdomen, white. Propodeum laterad, neck of prothorax and center of occiput, purple. Legs paler, distal third femur 3 above purplish. Club, funicle 6, black, also pedicel above and upper side more or less of funicles 1-3. Jaws wider and shorter than in genotype, the acute teeth equal. Funicles 1-2 nearly twice longer than wide, 6 quadrate, largest, flagellum somewhat compressed distad. Frons narrow, scape bowed, slender. Fore wing ciliated to base from hairless line (a patch of longish cilia at bend of submarginal vein) but the cilia colorless except against marginal and at the patch of hairs.

Fore wing narrower than in genotype, the hyaline cross-stripe wider (the base is lightly infuscated to the patch of hairs). Scutum with silvery pubescence.

North Queensland, east coast.

Phaenodiscoides lutheri, new species.

As compared with type of *australiensis* Girault differs: Teeth of jaw unequal, 2 distinctly exceeding 1 or 2, fore wing but lightly embrowned; funicle 5 also white; coxa 2 concolorous, femora save at tips white, marginal somewhat shorter than stigmal, equal postmarginal; head finely wrinkled, two lines pin-punctures each side of frons. Fore wing ciliated to base from hairless line. Scutum with numerous scattered punctures.

Cairns, Queensland, jungle, May, 1918.

Euplectrus lutheri, new species.

Runs to *cairnsensis* but entire abdomen black save for a median triangle above and below whose base is near middle, apex near base. Mouth yellow. Scape, coxae white, legs yellow. Scutum more coarsely scaly than scutellum.

Forest, Nelson, Queensland, March.

Eutrichosomella aereiscapus, new species.

Differs from the other known species: Scape, pedicel purple; cross-stripe from marginal deep; tibia 2 and 3 purple save apex, femora 2 and 3 so at proximal half; abdomen deep purple. Funicle 1 distinctly smallest. Purple, head, prothorax, scutum, scutellum, axillae dull brown; apex propodeum, coxae, legs except as stated, silvery. Bristles of dorsal thorax large; five lines of cilia proximad hairless line.

Forest, Murarrie, Queensland, October 20, 1921.

Echthrobaccha angeliconini, new species.

Dull purple, apical margin scutellum rather widely, green; wings clear, veins fuscous; club suffused with whitish, knees, tibial tips, tarsi yellowish. Characterized by funicles, 1-5 equal, over twice longer than wide, 6 half shorter, 1 subequal pedicel; club not half the funicle. Jaws as in *luciani* but 3 from base

of 2. Head as in *luciani* as to scape, frons and eyes; 4 of maxillary palpus columnar, not elongate, these palpi black, hairless line with six complete lines of cilia proximad of it, a half line along submarginal from these, setae of submarginal moderately small. Ovipositor free, not extruded, abdomen not long, conic.

Nelson, Queensland.

Syntomosphyrum teiae, new species.

Small. Brilliant green, wings clear, legs except bases of coxae, scape, pedicel pallid, rest of antenna dusky yellow; abdomen at basal fourth except very narrowly the margin, orange, distal margin of orange convex; like *Tetrastichus saint-pierrei* but abdomen depressed, ovate. A row of faint punctures along lateral margin of scutum, sculpture otherwise usual. Funicles one-fourth longer than wide, not as long as pedicel; club with a nipple and several latero-terminal spines. Propodeum with a weak median carina. Scape convexly dilated. Stigmal long, straight. Hind wings acute at apex, 5-6 lines of discal cilia. Fringes of fore wing longer than usual. Male similarly colored but antennae not seen.

From many females reared from *Teia ananectoides*, Hy. No. 484, Dept. Agriculture and Stock, Queensland. Also, same number, from *Galleruca semiputella* (through Henry Tryon).

Ovidoencyrtus, new genus.

Similar to *Pteromalencyrtus* but jaws falcate, 4 very minute, far down the inner side, 3 not half size of 2, latter distinctly shorter than 1. Marginal punctiform, postmarginal and stigmal subelongate, subequal. Abdomen distinctly smaller than thorax, flat triangular, a bit wider at base than long. Jaw 1 thorn-like, acute. Scape somewhat compressed. Frons moderate.

Ovidoencyrtus pallidipes, new species.

Dark aeneus, wing clear, legs yellow, antennae dark, scape white. Funicle 1 like a ring-joint in the *Pteromalidae*, 2 quadrate, rest somewhat wider than long. About four lines of cilia proximad the hairless line, these uniting caudad and running

toward base in a single line; a line along submarginal. A pair of lines along cephalic edge of costal cell, a third proximad. Submarginal setae moderately gross.

Many females from Reduviid eggs, Nelson, Queensland, August, 1920 (A. P. Dodd).

Stomatoceras unrubripunctus, new species.

Robust. Black with an elliptical red spot on femur 3 mesad at caudal margin somewhat distad of middle. As description of *australiensis* otherwise but besides the dark splotch along under marginal, whole wing fuscous; teeth of femur 3 forming two distinct convexities; funicle 1 a third longer than pedicel, twice longer than wide, half of the elongate 2, 3 or 4; 8 somewhat exceeding 1; propodeum with a large dorso-laterad tooth; postmarginal a bit exceeding marginal. Conspicuous silvery pubescence over head (excluding eyes) on axillae mesad, metapleurum, propodeum caudo-laterad and around the stout tooth, abdomens 2, 3 and 7 dorso-laterad (before apex in 2, over the others) and tibia 3 above; slight on vertex, upper thorax with dense black pubescence.

Tamboon, Victoria, H. W. Davey (Queensland Museum).

Muscidea cyanea Motschulsky.

From a Coccid, Hy. 969, Dept. Agriculture and Stock, Queensland. Antennae 8-jointed, no ring, one club, scape slender. Wings clear, veins fuscous, stigmal elongate. Thorax pin-punctate, frons more coarsely so. Jaw 2 widely truncate both sides. Head lenticular.

Epiblatticida particornis, new species.

As *lambi* Girault but ovipositor not extruded, free, body entirely aeneous save tibial tips and tarsi, these reddish and funicles 5-6, which are white; a brown mark along stigmal vein; jaw 3 narrower, funicles shorter, 3-4 subannular, four times wider than long, a third of 5 or 6; club larger, conic-ovate, a bit exceeding funicle; stigmal a bit exceeding the marginal, latter as long as in *lambi*, postmarginal half stigmal, with a bristle at apex; bend of submarginal triangularly produced, the

apex of the triangle with a long bristle; one line cilia proximad of the hairless line, then farther proximad, just proximad of the acute bend of submarginal, two lines, the three jointed caudad and running in a line toward base; a line to base along submarginal. Scape somewhat more dilated.

Cedar Creek, Queensland, October 3, 1921.

Stethynium immaculatum, new species.

Runs to *latipenne* but deep golden, flagellum dusky yellow; funicles 1-4 subequal, a bit longer than wide, rest globular, all shorter than pedicel; apex ovipositor valves black. Hind wings with a paired line of discal cilia, each margin, distad only. Line of setae on fore wing caudad of main ciliation, from near base of marginal, with about five moderately small setae in a broken line beneath venation.

Hy. No. 638, Dept. Agriculture and Stock, Queensland.

Eurytoma angelonini, new species.

Elongate, abdomen subsessile. Reddish yellow; antennae except scape, abdomen except sides and venter of 2-6, cephalic margin of propodeum, black. Postmarginal and stigmal equal, a bit over half of marginal, latter a bit thickened, veins light brown. Abdomens 2, 4 and 5 equal, longest, 3 transverse. Last joint maxillary palpus black. Propleura, face, legs yellow-brown. Funicle 1 over twice longer than wide. Reticulate, femoral furrow obscurely transverse-striate. Propodeum rugulose, punctate laterad, with a median channel. Club 3-jointed. Head and thorax pilose, the pile reddish.

Watsonville, Queensland, forest, March 13, 1919.

UNDESCRIBED SPECIES OF ANISOPODIDAE
FROM NEW ZEALAND—PART II

(Diptera)

BY CHARLES P. ALEXANDER

The first part under this general title was published in 1923 (Ins. Ins. Mens., 11, 73–74). The new species described at this time were collected by Mr. T. R. Harris in Westland, and at Taumarunui in the North Island, and by Mr. Leon Curtis in Otago. Recently, Mr. Edwards has made the interesting discovery that all of the New Zealand crane-flies hitherto described as species of *Trichocera* should be referred to *Paracladura* Brunetti, which was based upon a species from northern India. The genus is distinguished from *Trichocera* chiefly by the venation and the much abbreviated basitarsi. Besides the twelve species now known from the Maorian subregion, *Paracladura* includes four species from India and Formosa, and *P. trichoptera* (Osten Sacken) of western North America. The types of the new species described forthwith are preserved in the writer's collection through the kindness of the collectors, Messrs. Harris and Curtis.

***Paracladura harrisi*, new species.**

Male.—Length about 3.7 mm.; wing 4.4 mm.

Rostrum, palpi, antennae and head dark brown. Mesonotum and pleura uniformly fuscous. Halteres pale, the knobs brown. Legs with the coxae yellowish brown; remainder of the legs pale brown with only the terminal tarsal segments a little darker. Wings subhyaline, the veins dark brown. Venation: Sc_1 ending opposite r , Sc_2 at about midlength of Rs ; R_{2+3} a little longer than the basal section of R_2 ; $r-m$ oblique, inserted at the fork of M ; cell 1st M_2 closed but m weak; cell M_1 about twice its petiole; $m-cu$ about two-thirds m .

Abdomen dark brown throughout. Male hypopygium with the disti-styles moderately elongate, the mesal face near the basal third produced into an obtuse lobe which is entirely covered with microscopic setae as is the remainder of the mesal face. Each gonapophyse appearing as a flattened plate, the

caudal margin of which is produced into four or five conspicuous spines, in the type there being five on the right side and four on the left; beneath this apophyse and possibly a part of it, appears a complex structure which is densely set with appressed, feebly curved spines.

Habitat.—New Zealand (South Island).

Holotype, ♂, Rewanui, Paparoa Range, Westland, altitude 600–800 feet, February 15, 1923 (T. R. Harris).

Paracladura harrisi is named in honor of the collector, Mr. Thomas R. Harris, to whom the writer is vastly indebted for invaluable collections of New Zealand crane-flies. It is most nearly related to the larger *P. antipodeum* (Mik.) of the Auckland Islands; the latter species differs in the obliteration of *m-cu*, and in the details of structure of the hypopygium, as the short, broad-based aedeagus, the differently constructed gonapophyses, and other details.

***Paracladura curtisi*, new species.**

Male.—Length 2.6–2.8 mm.; wing 3.4–3.6 mm.

Female.—Length 3–3.3 mm.; wing 3.6–4.2 mm.

Head and appendages dark brown. Mesonotum dark brown, the lateral ends of the suture and the scutellum a little paler. Pleura brown. Halteres dark brown, only the extreme base of the stem paler. Legs dark brown throughout. Wings subhyaline, the veins dark brown. Macrotrichiae of veins long and conspicuous; base of cell 1st *A* with macrotrichiae. Venation: Sc_1 ending some distance beyond *r*, Sc_2 before mid-length of R_s ; *r* on R_2 a little more than its own length beyond the end of R_s ; *r-m* just beyond the fork of *M* on M_{1+2} ; cell M_1 comparatively shallow, subequal to its petiole; cell 1st M_2 open by the atrophy of *m*; *m-cu* longer than *r* in the ♂, subequal in the ♀, in alignment with the basal section of M_3 ; cell 2nd *A* narrow.

Abdomen dark brown, including the hypopygium. Male hypopygium of the same simple structure as *P. macrotrichiata* (Alexander); dististyles cylindrical, not at all produced on mesal face. Aedeagus and gonapophyses of very simple structure, the latter subtending and exceeding in length the

former, appearing as slender, straight rods directed caudad and lying very close together along the median line of the body. Just beyond mid-length of the aedeagus, on either side, appears a small oval lobe, gently divergent, directed caudad. Ovipositor obscure yellow, the tip darker.

Habitat.—New Zealand (South Island).

Holotype, ♂, Ben Lomond, Otago, altitude 2,500 feet, April 7, 1923 (L. Curtis).

Allotopotype, ♀.

Paratopotypes, 15 ♂♀.

Paracladura curtisi is named in honor of the collector, Mr. Leon Curtis, who has collected much valuable material in the vicinity of Lake Wakatipu and on Stewart Island. It is most closely allied to the larger *P. macrotrichiata* (Alexander) from which it differs chiefly in the details of structure of the male hypopygium and in the venation, especially in the relatively shallow cell M_1 . The macrotrichiae are neither so numerous nor so extensively distributed as in *macrotrichiata*. In the latter species, the aedeagus extends far beyond the gonapophyses which are recurved and decussate across it.

***Paracladura decussata*, new species.**

Male.—Length about 2.8 mm.; wing 3 mm.

Generally similar to, and a close relative of, *P. obtusicornis* (Alexander), from which it differs chiefly in the structure of the male hypopygium. Head dark grey. Mesonotum shiny brown. Wings paler. Venation: Sc_1 ending shortly beyond the fork of R_{2+4} ; Sc_2 about opposite one-fourth the length of Rs ; m faint, beyond midlength of the petiole of cell M_1 ; cell 2nd A long and narrow.

Male hypopygium with the dististyles relatively short, cylindrical, feebly arcuated, entirely without lobes. Gonapophyses very conspicuous, appearing as powerful chitinized arms, directed caudad and thence mesad so as to be decussate across the genital chamber, the extreme tips suddenly narrowed and acute. In *P. obtusicornis*, besides the flattened, obtuse plates, there are slender and very delicate, strongly curved horns directed cephalad and thence mesad.

Habitat.—New Zealand (North Island).

Holotype, ♂, Taumarunui, April 30, 1923 (T. R. Harris).

***Paracladura complicata*, new species.**

Male.—Length about 3.2 mm.; wing 3.7–3.8 mm.

Female.—Length about 3.4 mm.; wing 4 mm.

Generally similar to and a close ally of *P. lobifera* (Alexander), from which it differs in the darker coloration and the very distinct structure of the gonapophyses of the hypopygium.

The general coloration is much darker than in *lobifera* but paler than in *maori*. The anterior part of the mesonotal praescutum is darker than the sclerites behind the suture. Wings pale brown, the veins darker. Venation: *m* far out on the petiole of cell M_1 , usually less than its own length from the fork, due chiefly to the great depth of cell M_1 .

Male hypopygium with the dististyle bearing a conspicuous, subbasal lobe on mesal face, as in *lobifera*, the apex of this lobe subacute and glabrous. The armature of the genital chamber is very intricate; the lateral pair of plates bear one or two apical spines that are directed caudad, and two or three long spines on the outer or lateral edge that are directed laterad. A transverse slender bar lying across the chamber has the mesal end terminating in two powerful spines the mesal one small, the lateral one about twice as large, directed chiefly caudad; lateral or outer ends of this bar extend laterad and terminate in numerous powerful curved chitinized hooks, the terminal ones largest, becoming smaller mesally and obsolete near midlength of each arm; the arms of either side lie almost in a straight line across the genital chamber. What seems to be the aedeagus is a massive, central plate, each lateral angle produced into a slender arm directed caudad, the tips strongly mesad, to produce a somewhat lyriform appearance.

Habitat.—New Zealand (North Island).

Holotype, ♂, Taumarunui, April 30, 1923 (T. R. Harris).

Allotopotype, ♀.

Paratopotypes, 5 ♂♂; paratypes, 2 ♂♂, Ohakune, May 10, 1923 (T. R. Harris).

NOTES ON CALLIPHORIDÆ

By RAYMOND C. SHANNON

The exclusion of *Pollenia* (*P. rudis*) from the family Calliphoridae, in my recent treatment of the group¹ resulted in a discussion with Mr. J. R. Malloch in which, after a consideration of the Old World species of *Pollenia* and allied genera, it was agreed that the scope of the family should be broadened to include this group.

The revised characterization of the Calliphoridae is presented in the following key (by Malloch and Shannon).

1. Hypopleura bare, or only with some fine hairs (Scatophagidae, Anthomyiidae, Muscidae).....*Muscaridae*.
Hypopleura with one or more vertical series of strong bristles.....2.
2. Postscutellum very pronounced².....*Tachinidae*, *Dexiidae*.
Postscutellum rudimentary or absent³.....3.
3. Species with arista minutely pubescent or bare, with prosternum and postalar declivity bare; notopleurals 2; sternopleurals 1:1 (Wohlfartinae, Metopiinae).....*Sarcophagidae*, in part.
Species with arista hairy, often plumose, if almost bare the prosternum and postalar declivity hairy.....4.
4. Notopleurals 3 or 4; posthumeral never laterad of presutural; sternopleurals usually 1:1:1; hind coxae hairy behind, above base of hind femur*Sarcophagidae*, part.
Notopleurals 2; sternopleurals 2:1 or 1:1, never 1:1:1; posthumeral usually laterad of presutural, sometimes in line with it, rarely absent, never mesad of presutural; hind coxae bare behind, above base of hind femur.....*Calliphoridae*.

The above characterization holds good for these families for all parts of the world as far as our material at hand shows.

The third subfamily of Calliphoridae, Polleninae, represented in North America by *Pollenia* and *Melanodexia*, may be distinguished from the others as follows: Prosternum and propleura bare; sternopleurals 1:1; parafacials hairy down to lowermost margin of eye. All the others have the prosternum and propleura hairy.

¹ Ins. Ins. Mens., XI, 101-118.

² I. e., Metanotum with a double convexity.

³ I. e., Metanotum with a single convexity.

NEW LEPIDOPTERA FROM MEXICO AND ONE FROM ARGENTINA

By HARRISON G. DYAR

Family HESPERIIDAE

Bolla semitincta, new species.

Male. Wings subquadrate, the hind wing roundedly angled centrally; black, the outer half of hind wing sprinkled with white scales, leaving an indistinct dark band in the middle; fore wing with two minute white dots subapically and one in the end of the cell. Beneath dull blackish, the hind wing tinged with grayish broadly over the tornal area.

Female. More grayish tinged, the outer half of fore wing showing this color faintly; subapical dots larger than in the male, the one in cell absent, but one above vein 2 outwardly.

Expanse, male, 26 mm.; female, 26 mm.

Types, male and female, Colima, Mexico, December, 1922 (R. Müller).

Family NOCTUIDAE

Nephelistis schedogymnopsis, new species.

Fore wing dark purplish brown, the median space filled in with darker brown; lines slender, pale, powdery, converging on inner margin, the outer inflexed at costa; reniform and orbicular pale outlined, oblique, converging on median veins; veins lighter; faint irregular lighter subterminal line. Hind wing blackish, a little lighter at base; discal dot round, dark. Expanse, 25 mm.

Type, male, Zacualpan, Mexico, November, 1922 (R. Müller).

Perigea gurrha, new species.

Clay-color with reddish tint centrally on fore wing, the markings contrasted but broken and punctiform; a dark shade in cell, relieving the pale orbicular and reniform, the latter with enclosed black dot in lower segment; inner line double, irregular, tending to dots on the veins; outer line of two rows of dots on the veins; a dark submarginal flexuous shade, cut off by the pale apex; termen dark, with black terminal dots between

the veins. Hind wing dark fuscous, pale and yellowish at the base in the male, not so in the female. Expanse, 32 mm.

Types, male and female, male, Zacualpan, Mexico, October, 1922; female, Cuernavaca, Mexico, May, 1914 (R. Müller).

***Lithacodia xemiloca*, new species.**

Fore wing orange-brown from base to a line a little beyond middle, perpendicular to costa, slightly inflexed mesially, shining purplish raised scales; with a few dark ones on the outer edge; space beyond to subterminal line again orange-brown; a broad wavy subterminal line of raised light purplish scales, narrowly separated from termen by brown; fringe brown without reddish tint. Hind wing blackish, the base lighter and yellowish; a black terminal line; outer section of fringe white. Expanse, 16 mm.

Type, female, Colima, Mexico, February, 1923 (R. Müller).

***Phoenicophanta modestula*, new species.**

Fore wing purplish brown, crossed by two broad distinct white lines, the inner slightly, the outer more strongly wavy, slightly excurved on mesial third; three little white dashes on costa before apex a terminal dark line, preceded narrowly by white. Hind wing scarcely lighter than fore wing, unmarked. Expanse, 14 mm.

Types, four females, Sierra de Guerrero, Mexico, May, 1915, and September, 1922 (R. Müller).

***Lois*, new genus.**

Hind wing with veins 2 and 5 near angle of cell, 3 and 4 shortly stalked; palpi upturned, the third joint slender and spatulate, as long as the second. Legs unarmed, abdomen with a crest on basal segment; vestiture of thorax scaly, mixed with hairs posteriorly.

***Lois monoflex*, new species.**

Fore wing light gray with silvery purplish reflection; inner line black, starting in a wedge-shaped spot on costa, incurved, ending at vein 1; a dark oblique mark on middle of costa; outer line black, from costa to vein 4, angled, running to base of

vein 3, angled, and straight to inner margin; a faint gray wavy subterminal line, sharply angled and duplicated between veins 3 and 4; a terminal faint wavy line, retreating from the margin between the veins. Hind wing white, veins and terminal area fuscous shaded. Expanse, 43 mm.

Type, male, Colima, Mexico, January, 1923 (R. Müller).

Family NOTODONTIDAE

Cerura xicona, new species.

White, the fore wing with a double inner line filled in with pale olivaceous; a basal black dot and single line beyond; outwardly three lines, dentate on the veins, the two inner lost costally and replaced by thickened dashes drawn a little basad, the outer one reaching costa and margin, followed by an outward thickened dark subapically and an S-shaped mark at tornus; veins narrowly black lined; large black dots in the fringe between veins. Hind wing white, with dots in the fringe only. Expanse, 34 mm.

Type, male, Zacualpan, Mexico, November, 1922 (R. Müller).

Nearest *C. presidio* Dyar, but smaller and more delicate, the discal annulus wanting.

Bahaia, new genus.

Vein 5 on hind wing very weak; fore wing without accessory cell, veins 7-10 stalked; male antennae bipectinate on the basal two-thirds; veins 3 and 4 of hind wings from a point.

Bahaia sceletaria, new species.

Fore wing light gray, sprinkled with purplish black scales; a rather broad red-brown area runs along vein median and covering the bases of veins 2 and 3, continued above by a dark brown shade to outer margin below apex and below by a wavy dark brown line, parallel to the other and also reaching margin, forming a conspicuous angled spot below vein 2; costa shaded with dark; a dark terminal line; subterminal line dark, preceded by lighter, broken into segments between the veins. Hind wing whitish. Expanse, 32-33 mm.

Types, two males, Colima, Mexico, April, 1923 (R. Müller); Jalapa, Mexico (gift of E. T. Owen).

Family GEOMETRIDAE

Thysanopyga puatartia, new species.

Wings light gray, a little clay-colored, strigose-irrorate with darker, forming two faint bands outwardly on fore wing and three on hind wing; a faint white discal dot on fore wing, more distinct on hind wing. Beneath pale gray, finely irrorate with darker. Expanse, 25 mm. Male.

A female from the same locality and bearing the same number differs in being darker gray, the strigae more discrete and reddish, a black discal dot on fore wing and white one on hind wing.

Type, male, female doubtfully associated, Guerrero, Mexico, male, July, 1922, female, November, 1921 (R. Müller).

Gloduria, new genus.

Fore wing with veins 7-10 stalked; a long narrow accessory cell, formed by vein 11, which anastomoses with vein 12 as well as with 10 to form it. Hind tibiae with but one pair of spurs. Front conically produced but rounded, without horn or chitinous structure. Palpi reaching the front in the male, shorter and weaker in the female. Tongue wanting. Wings elongate. Male antennae bipectinated to the tip, of the female simple.

Gloduria dyslogista, new species.

Male. Light gray, powdered with black; lines slender, black, whitish edged away from median space, the inner obscure, bent at right angles on discal fold; outer oblique, dotted on the veins, outwardly angled on vein 4; a round discal mark, its center whitish powdered. Hind wing with extramesial line, dentate on the veins, followed by whitish, and preceded by a dusky line that runs through the discal mark, this latter a little larger than on fore wing. Expanse, 38 mm.

Female. As in the male, but all the markings fainter, nearly lost in the powdery surface. Expanse, 47 mm.

Types, male and female, Colima, Mexico, June, 1923 (R. Müller).

Zacualpania, new genus.

A Larentiid genus allied to *Grosbeckia* B. & McD. Tongue present; palpi very short and porrect, not reaching front; front produced to a pointed tubercle centrally above; antennae of male with long pectinations, becoming short at extreme tip; hind tibiae with two pairs of spurs; fore wing elongate, triangularly pointed at apex, vein 2 leaving median at right angle, then sharply curved, a short narrow accessory cell, veins 7-10 stalked from its end, vein 11 from its upper angle. Hind wing elongate oval, more than twice as long as wide, cell very wide, vein 2 much as on fore wing but less erect, 3, 4, 5, wide apart, 6-7 shortly stalked, 8 anastomosing with subcostal to rather near end of cell.

Zacualpania tornitracta, new species.

Rather dark gray, irrorate, markings slight; outer line black, faint, whitish edged outwardly, sharply dentate inwardly on the veins, roundedly outwardly in the interspaces, most distinct between vein 2 and margin; inner line similar, indicated only near inner margin. Hind wing smooth light gray. Expanse, 27-29 mm.

Types, two males, Zacualpan, Mexico, July, 1922 (R. Müller).

Family LIMACODIDAE

Parasa mionexia, new species.

Male. Dorsum of thorax green. Fore wing dark brown on basal two-thirds, the terminal third sharply paler; terminal line dark. Hind wing light yellow-brown, terminal line dark; a dark brown area below cell toward base. Expanse, 20 mm.

Female. As in the male, but fore wing with a broad green band occupying the middle third and running to base below vein 1. Expanse, 24 mm.

Types, three males and one female, Tucuman, Argentina (R. Schreiter, gift of Wm. Schaus).

Euprosterina vagabunda, new species.

Female. Fore wing dark red-brown, lighter over discal area,

the scales gathering into an obscure dark discal cloud; margin very narrowly but sharply pale clay-color, sprinkled with dark brown scales; fringe pale. Hind wing dark brown with pale fringe. Expanse, 17–20 mm.

Types, six females, some in poor condition, Sierra de Guerrero, Mexico, July, 1913, September, 1922; Cuernavaca, Mexico, July, 1914 (R. Müller).

Without the male, the generic location is somewhat uncertain.

Family PYRALIDAE

***Samea druchachalis*, new species.**

Fore wing dark brown; an inner erect semihyaline bar to below costa, narrowly obliquely cut by the brown inner line; a similar median white bar, absorbing or subdisconnected from the erect white reniform; outer line blackish, scarcely relieved from the ground color, followed by small white spots between the veins, outcurved over discal nervules, angled on vein 2; an oblique row of white spots beyond the cell; six white flecks on costa toward apex; fringe checkered with white. Hind wing brown-fuscous, more or less distinctly pale on disk; a dark extra-mesial line, excurved on its middle segment and followed by whitish; terminal edge dark; fringe whitish, with dark basal interline. Expanse, 19–20 mm.

Types, one male, two females, Colima, Mexico, January and February, 1923 (R. Müller); Venadio, Sinaloa, Mexico (A. Kusche, gift of B. Preston Clark).

***Nymphula panpenealis*, new species.**

Fore wing light brown; a dark shade from base along costa and along median vein to basal third, the narrow elongate black orbicular between their terminations; a slight undulate median line, forming a bar between orbicular and reniform; reniform black, round; outer line dark, oblique, blurred-wavy, a little inflexed mesially; a faint straight subterminal line; a dark distinct terminal line. Hind wing pale brownish, clear at base; discal mark a large dark dot; mesial line broad, brown, touching the discal mark, followed by a shade darker than the ground

and limited by a fine serrate brown line; submarginal line broad, distinct, brown; termen darker than ground; fringe pale. Expanse, 14 mm.

Type, male, Mexico City, Mexico, July, 1923 (R. Müller).

A NEW NOCTUID FROM LOUISIANA

(*Lepidoptera, Noctuidae*)

By HARRISON G. DYAR

The Bureau of Entomology received from Professor Thomas H. Jones, of Baton Rouge, specimens which appear to represent a new form, both generically and specifically. Professor Jones says: "On June 19, 1923, while splitting open stems of various wild grasses at Elm Park (West Feliciana Parish), Louisiana, with the idea of ascertaining whether *Diatraea saccharalis* larvae were working in them, I found a large pink larva tunnelling in a rank-growing grass, specimens of which have since been determined by the Bureau of Plant Industry, through the kindness of Mr. J. E. Graf, as *Erianthus saccharoides*. Inasmuch as Mr. T. F. Holloway of the Bureau of Entomology found a pink larva boring in sugar-cane in Mississippi (see 'A New Sugar-Cane Borer,' by T. W. Harned, Quarterly Bulletin of the State Plant Board of Mississippi, Vol. II, Nos. 1-2), it occurred to me that the one I had found might be the same species. After several attempts, seven moths have issued from a collection of larvae made by Messrs. C. E. Smith and W. G. Bradley at Elm Park on September 22, 1923. Pupae were found below the surface of the sand in the breeding jars, and field observations indicate that the larvae leave the grass-stalks in the field and enter the soil to pupate.

"Mr. Bradley states that in breeding jars the larvae fed on sections of corn and sugar-cane stalks; but where both were present, they preferred the sugar-cane."

Subfamily CUCULLIINAE

Meropleon cosmion, new genus and species

Eyes overhung by long hairs, in a group below and a little

in front of the antennae, not equally distinct in all specimens. Tegulae not produced behind into a hood; frons smooth; tibiae and tarsi unarmed; tongue well developed; tegulae not produced into a dorsal ridge; abdomen with dorsal crests on basal segments; thorax clothed with hair and hair-like scales, a few scales at ends of patagia; palpi with the third joint short; prothorax without crest, metathorax with divided crest; fore wing with the termen shallowly crenulate.

Fore wing dark purplish, shaded with black on the veins centrally, the terminal space light ash-gray; median vein white to its end, the cell filled in with white including or nearly including the oblique elliptical orbicular; reniform diffused, reddish, sometimes with a white inner bar erect from the end of the white median vein, or partly suffused with white; the white in the cell may diffuse to the costa; no distinct lines, the outer line indicated by a double row of dark points on the veins, preceding the terminal ashen area; fringe dark, pinkish. Hind wing pale, pinkish tinged, with a few scattering black scales. Expanse, 34-47 mm.

Types, four males and two females, Elm Park, Louisiana (Smith & Bradley).

NOTES ON CULICIDAE (AÈDES)

By ROBERT MATHESON

In a recent paper¹ Dyar has considered *Aedes abserratus* F. and Y. and *Aedes auroides* Felt as identical species and placed them as synonyms of *Aedes punctor* Kirby. He has based this conclusion on the variable markings of the adult and the identical structures of the male genitalia. Furthermore, he has endeavored to show from rearings that the number of comb-scales in the larvae varies from 6 to 17 and the supposed larval differences indicated by Felt are thus bridged. He has omitted some characters which are very distinctive and I have consistently considered *A. auroides* Felt and *A. abserratus* F. & Y.

¹ Ins. Ins. Mens., 7, 14-17, 1919.

as distinct species. However, the descriptions by Felt of the larval and the adult characters of these species were not sufficiently detailed to warrant me in determining their exact status in relation to *A. punctor* Kirby. Edwards (1921)² has indicated that *punctor* Kirby has a European form which he thinks may be considered as a variety (*A. punctor* var. *meigenanus* Dyar). Recently Wesenberg-Lund³ has published an account of *Aedes* (*Ochlerotatus*) *punctor* Kirby based on the identification of material by F. W. Edwards, of the British Museum.

In order to determine the exact status of *abserratus* F. & Y. and *auroides* Felt, I visited the New York State Museum and through the kindness of Dr. Felt and Dr. Leonard I was able to obtain the type material. On examination, my previous doubts were sustained and *abserratus* F. & Y. is distinct from *A. auroides* Felt. *Aedes auroides* Felt is a synonym of *Aedes punctor* Kirby, the larval and adult characters agreeing in every detail with published accounts and figures.

Dyar⁴ (1921) in a study of the *punctor* group of *Aedes*, describes a new species, *Aedes dysanor*, based on males from Plattsburg, N. Y. The larva is unknown and apparently the author did not have females of this species. Dyar considers the larva to be close to *punctor* and perhaps indistinguishable.

I have before me a long series of the larvae of *A. abserratus* F. & Y., also bred males and a few females. The genitalia of *abserratus* F. & Y. are identical with Dyar's figures of *A. dysanor*. Felt's material came from Elizabethtown, N. Y., not far from the place where Dyar's *dysanor* was taken. The larvae are also distinctive and easily separable from those of *punctor* Kirby (*auroides* Felt). Dyar in his study of the larval characters of *abserratus* F. & Y. and *auroides* Felt is clearly in error in his conclusions. From examination of 41 larvae, the head-hairs in all cases are single (1—1) whereas in *punctor*

¹ Bul. Ent., Res. 12, 313, 1921.

² Mem. de l'Academie Royale des Sciences et des Lettres de Danemark, Copenhague, Section des Sciences, 8me Serie T, VII, No. 1:79-81, 1920-21.

⁴ Ins. Ins. Mens., 9, 70, 1921.

they are generally 2—2 or 1—2, though at times 1—1. Wesenberg-Lund figures for *punctor* Kirby 2—2 head-hairs. The comb scales in *abserratus* F. & Y. vary from 5 to 7, rarely 8 (1 case in 40 counted) placed in a row. The number varies on each side running as 5/5, 5/6, 5/7, 6/6, 6/7, or 7/7. In *punctor* the comb scales vary from 11 to 15, the number on each side usually being different (9 counted), and placed in two distinct rows. The most distinctive and easily recognized larval character is that of the dorsal brush of the anal segment. In *abserratus* F. & Y. this consists of four long stiff hairs; in *punctor* Kirby it consists of two long stiff hairs and a pair of brushes, each consisting of 6–8 hairs arising from a common base.

The synonymy of these two species should therefore stand as follows:

***Aedes punctor* Kirby.**

Culex punctor Kirby. Richardson's Fauna Bor. Amer. 4:309, 1837.

Culicella auroides Felt, Bull. 79, N. Y. State Mus., 448, 1905.

***Aedes abserratus* Felt and Young.**

Culex abserratus Felt and Young. Science, n. s. 20, 312, 1904.

Aedes dysanor Dyar, Ins. Ins. Mens., 9, 70, 1921.

NOTE ON AEDES PUNCTOR KIRBY

(*Diptera, Culicidae*)

By HARRISON G. DYAR

Professor Matheson's separation of the larvae of *Aedes punctor* (*auroides*) and *abserratus* (*dysanor*) is interesting, but the characters are not so sharp as he indicates. By consulting my table (Ins. Ins. Mens., vii, 16, 1919) it will be seen that the comb-scales continuously grade from 6 to 17, while the head-hairs are indiscriminately single or double. Applying the character of the hairs of the anal segment, it results that the first two entries on my table (C5 and B39) are *abserratus* and all the rest *punctor*. The male C5 was mounted and showed typical *dysanor* genitalia. Therefore Matheson's statement of

the number of comb-scales in *puncator* should read 8 to 17, while the character of the head-hairs will have to be abandoned as diagnostic.

To complete the synonymy, *centrotus* H., D. & K. should presumably be added to *abserratus* F. & Y. The types came from White River, Ontario, where my own collecting was done, and the isolations C5 and B39 are evidently larvae of this very form.

In the larva of the European form (*meigenanus*), which I have from England by the kindness of Mr. F. W. Edwards, the tuft of the anal segment is as in *puncator*, a long hair and a tuft on each side; comb-scales about 12 in a narrow patch; head hairs double or in threes.

The western American forms *aboriginis*, *cyclocerculus*, *leuconotips* and *hexodontus* all have the anal hairs as in *puncator*, and thus in this respect *abserratus* (*centrotus* = *dysanor*) is unique, even as the male genitalia are unique.

Concerning the two names of Walker, I have referred them to *puncator* on information furnished by Mr. Edwards (Ins. Ins. Mens., viii, 3, 1920). In respect to the present differentiation, however, this is not final.

Concerning *implacabilis*, Edwards says: "Is almost certainly the same as *puncator* as identified by you." In another letter: "Mesonotum apparently all light brown, but a large pin is stuck right through the middle." The specimen is a female from Martin Fall, Ontario. This can be nothing else than *abserratus*, assuming that it belongs to the *puncator* group at all. I would make the reference definite.

Concerning *provocans*, Edwards says: "Is quite unrecognizable, but *might* be *puncator*." Also: "There are two specimens, of which the male is probably the type; the female may not belong. ♂ perhaps = *impiger*, but the white scales look rather broader. Tip of abdomen is missing." Since the abdomen is broken in the male type, no positive determination can be had from the genitalia. The white scales mentioned by Edwards are presumably those left at the sides of the mesonotum, which suggests *puncator* rather than *abserratus*. The

name may therefore remain where it is, giving the following synonymy:

Aedes punctor Kirby.

Culex punctor Kirby.

Culex provocans Walker.

Culicelsa auroides Felt.

Aedes implacabilis Walker.

Culex implacabilis Walker.

Culex abserratus Felt & Young.

Aedes centrotus Howard, Dyar & Knab.

Aedes dysanor Dyar.

SOME NEW AMERICAN HELOMYZIDAE

(Diptera)

By C. B. D. GARRETT

In March and April, Helomyzids are very common in the Cranbrook District of British Columbia. On May 5, 1919, I took a female supposed to be *Leria serrata*, but which had two very strong vibrissae and four sternopleural bristles. No other differences were noticeable, and the specimen was considered a freak. From March to May I took perhaps two thousand Helomyzids, containing a large number of *serrata*, and in going over them, one proved to be a male, matching the above-mentioned female. In coloration and size they are exact duplicates of *Leria serrata*. The male is easily separated by the very short hind tarsus and the distinct hypopygium; the female is much more difficult of separation, unless we rely entirely on the four sternopleural bristles; otherwise we have left only the three or four rows of hairs below the vibrissae, where in *serrata* there is only one.

Leria serrataria, new species.

Foremost fronto-orbital about equal to the hind; four or five pairs of prosternal bristles; four dorso-centrals; one humeral. Thorax gray-black, abdomen red-yellow.

Male. Two long strong vibrissae (*serrata* has one median and one short); three rows of hairs below them (*serrata* has one). This makes the space to the eye very small. Three strong sternopleural bristles (*serrata* has one). Hind tarsus I very short, about half the length of the second; hind femora swollen. Hypopygium distinct, very similar to that of *Leria latens* Aldr.

Female. Very similar to *serrata* excepting the longer vibrissae, with the three rows of hairs below, narrower gena, three sternopleural bristles; hind femora not swollen; hind tarsi I and II about equal (in *serrata* I longer than II). Postnotum with a distinct central ridge, less pronounced than in the male.

The male tarsi, sternopleural bristles and hypopygium show it as a close ally of *latens* Aldr.

In April, 1923, I collected in the south end of the Okanagan Valley, British Columbia, and secured a female. Also, on Mount Apex, at an altitude of 1,000 feet, I took a male and four females.

Holotype, male, Mount Apex, B. C., July, 1923; allotype, female, Okanagan Valley, B. C., April, 1923, in the Canadian National Collection; male and female paratypes, Cranbrook, B. C., May, in the author's collection.

***Amoebaleria perplexus*, new species.**

Male. Foremost fronto-orbital about three-fourths of the hind one; one pair of prosternals; four dorso-centrals, one humeral bristle. Entire head, thorax, pleura, legs and hypopygium reddish yellow or brown; tarsi darker; abdomen blackish brown.

One vibrissa rather long and fine; three rows of oral hairs below. Front and antennae red-yellow; arista long, with microscopic pubescence. Dorsum of thorax with fine long hair; a dark red-yellow vitta through the roots of the dorso-centrals; another not reaching the suture beyond it. Dorso-centrals very fine; scutellum with four bristles; pleural bristles, one propleural, one sternopleural; mesopleura bare, except a square patch of long fine hairs below the disk; pteropleura

bare; sternopleura covered with long fine hairs, longer and stronger between the coxae, where only I is bristly. No distinct abdominal bristles, but entirely covered with long fine hairs; legs the same. Wings dark hyaline basally; tip of scutella yellowish.

Holotype, male, Wilson Creek, Michel, B. C., August 23, 1921, in author's collection; paratype, male, Mount Apex, 7,000 feet, Headly, B. C., in the Canadian National Collection.

The male hypopygium, from a fresh extended specimen, was compared with that of *A. scutellata*, mounted on a slide, proving the entire distinctness of the two species. *Perplexus* bears the same relationship to *scutellata* that *gigas* does to *fraterna*.

In examining the male hypopygia of a series of *Anorostoma* before me, it appears that two other forms are represented besides *currani* recently described by me. These forms may not be distinct species, but may represent geographical races. Until such time as the male hypopygium of Loew's type of *A. marginata* is exposed, we cannot state definitely just which is Loew's species. The following descriptions are presented subject to that correction.

Anorostoma coloradensis, new species.

Male. Head pale red-yellow, front redder, antennae pale red-yellow; arista shorter than the eye; one vibrissa; a single row of hairs below, well separated from the oral margin; two fronto-orbitals, the foremost about half the length of the hind. Thoracic dorsum yellow-brown, dark brown spots at the roots of the hairs and bristles, four dorso-centrals and scant short black hair. Pleura yellow-brown, a darker brown stripe from the humerus across the mesopleura to the top two bristles. Propleura, one bristle; mesopleura one, and above it a short bristly hair, below it a longer bristly hair, in a row along the hind edge. Two coarse hairs below the disk. Pteropleura bare. The suture between the meso- and pteropleura joins the sternopleura almost at right angles and if continued would pass well in front of the bristle. Sternopleura with one bristle near the top hind corner, with a few scattered hairs running directly

down the center to many bristly hairs below the coxae. Abdomen yellow-brown, black haired. Wings hyaline, small cross-vein slightly infuscated, veins yellow to brown. Legs pale red-yellow, fore femora with a dorsal and a ventral row of four or five bristly hairs, the rest rather scantily haired. Mid-femora, one longer bristly hair on the outside about the apical third; a row of bristly hairs on the lowest inner edge. Hind femora with four strong bristly hairs on the apical third near the outer edge. Claws brown, slightly black tipped, and about as long as their tarsal joint; tarsus 5 hardly as long as 3 and 4 together.

Female. In general exactly as the male, but the abdomen is blacker, the top mesopleural hair is longer than the third, there is an additional bristly hair in front of the sternopleural bristle, fore femora with two rows of bristly hairs on the upper edge, only two bristly hairs on the hind femora; tarsi longer and narrower, claws shorter.

Holotype, male, Colorado, labeled 2158 (through Dr. C. W. Johnson).

Allotype, female, Colorado, labeled 2030 (through Dr. C. W. Johnson).

Paratype, male, Colorado, labeled 1389, received from the State Natural History Survey of Illinois, Urbana, and returned to them.

Anorostoma jersei, new species.

Male. The description of the male of *A. coloradensis* will suffice for this also, and we give for this species a comparative description. The insect is larger. A much less sloping front from the oral margin to the antennal base; head deeper, fronto-orbitals wider apart; thoracic dorsum more hairy; fore femora with stronger bristly hairs, and an additional smaller row near the top edge; mid femora with the bristly hair stronger. Both hind legs missing. Claws brown with the tips black to nearly half way, and long; tarsus 5 appears to equal 3 and 4 together. Sternopleura with a single row of hairs down the center; meso- and pteropleural suture sloping back, joining the sternopleura

in a direct line to the bristle; mid tibial spurs larger and stronger. Hypopygium on a slide.

Monotype, male, Manumuskin, New Jersey, May 5, 1903 (through Dr. J. M. Aldrich).

Following is proposed a new genus and also a key, which will place the genus *Lutomyia* described by Dr. Aldrich last October. These two genera seem to occupy the missing links, as it were, to two distinct branches of development. The importance of prosternal bristles seems further increased as being of the most modern development, though perhaps of no generic value. *Leria incrs* Meig. appears the most primitive form of the genus. The genus *Lutomyia* seems the direct route to *Leria*, and *Viatica* to *Eccoptomera*.

For those who wish to place these genera in my key published in this magazine (ix, nos. 7-9, page 120, 1921), we start at section 6 and reconstruct it.

6. Mid femora with one to three rows of stout spines on the outer side; spinulae long and stout.....6c.
 Mid femora with no such spines, setulae usually small.....6a.
 6a. Mid tibia with a very short preapical bristle; a single extra long apical spur, much longer than the apical bristle,

Thephrochlamys Loew.

- Mid tibia with several longish apical spurs.....6b.
 6b. Mid tibia with one preapical bristle; the small cross-vein usually below the tip of R. I.; usually two pairs of scutellar bristles,

Morpholeria Garrett.

- Mid tibia with two or three preapical bristles; tip of R. I. far beyond the small cross vein; usually three or four pairs of scutellar bristles,

Crymobia Loew, *Anorostomoides* Malloch, *Barbatus* Garrett.

- 6c. Small cross-vein over the basal fifth of the discal cell; veins Sc-R. I. very short, R 3+4 shorter than usual.....*Lutomyia* Aldrich
 Veins about normal; mid tibial apical spurs long and numerous; mid tarsus I with four or five pairs of apical setulae, one very long pair, those of tarsus II not so prominent; head deep, oral margin far beyond the root of vibrissae.....*Viatica* new genus.

***Lutomyia distincta*, new species.**

A striking general resemblance to *Leria serrata*. Foremost fronto-orbital about half the length of the hind one; four dorso-centrals, one humeral.

Head, occiput gray, front dark orange-yellow, face dark red-yellow, antennae very dark red-yellow, third joint round; arista (somewhat blunt-tipped and thus may be broken, though of even length in both) black, microscopically pubescent. One long vibrissa and one row of long black hairs below it. Bare gena about half the depth of the eye. Oral cavity sloping up toward the antennae (?the original step to genus *Anorostoma*), thus shortening the space below them; oral margin chitinized all around, and well above the root of the vibrissae; thorax, dorsum gray-black, with a brown shade, thickly covered with short thick black hair; scutellum, four bristles; pleura gray-black, one propleural bristle, mesopleura bare except four hairs below the disk; pteropleura bare; sternopleura, one strong bristle near the top hind corner, then one median bristle, then two short bristly hairs in a row before it, the rest bare to the level of the coxae, between which are many long hairs and bristles. Halteres red-yellow.

Wing spines rather short. Veins Sc, R1, R2+3, all shorter than usual. Sc joins C nearly above but a little beyond the small cross-vein; R1 joins C less than half way over the discal cell, but more than its basal third. R2+3 parallels R1, entering C in its third quarter at a point just beyond the large cross-vein. R4+5 not quite reaching the extreme apex of the wing, thus lying almost directly above the tip of M. Small cross-vein joins the discal cell at less than the length of the first basal, or about one-sixth of the discal; large cross-vein normal.

Wings gray hyaline and in lights slightly yellowish.

Abdomen, red-yellow, with short thick black hairs and apical bristles. Legs red-yellow, fore femora infusate outside, fore tarsi depressed cordate, in 2, 3, 4, the 5th more linear; tarsi of the other legs all linear, especially of the mid legs. Mid femora with a row of 10 or 11 thick spiny bristles down the middle. Mid tibia with 8 apical spurs; mid tarsus 1 with two dorsal and two ventral pairs of apical spines, the others with only one set, those of the hind tarsi not conspicuous.

Monotype, female, Bentleys Siding, Rushmere, Windermere, British Columbia, November 15, 1922 (C. Garrett).

Rushmere is about 11 miles south of Windermere, at the foot of the lake. The large eye, spines on the femora, and shape of the fore tarsi seem to denote the origin of *Leria iners*, Meig.; on the other hand the mid leg is far more like that of *Eccoptomera simplex*, which also has the small cross vein slightly before the middle of the discal cell.

Viatica, new genus.

Two fronto-orbitals, the foremost from about a half to three-fourths of the hind one. No prosternal bristles. Mid tibia with one preapical bristle. Head deep, eye large; mid femora with irregular rows of spines on the outside. Genotype, the following.

Viatica spinosus, new species.

Head deep, viewed from the front deeper than broad. Foremost fronto-orbital just less than half the hind one. Eye perpendicularly oval, its height about equal to the length of the head. One strong vibrissa, one row of hairs below, top of the oral margin very much higher than the root of the vibrissae and chitinized all round; oral margin to antennal roots straight. Head and antennae red-yellow, both third joints missing. Thorax, dorsum of mixed colors, general look black-gray, with the edges of humeri and scutellum red-yellow; four very strong dorso-centrals with slight dark brown spots at their roots and much short thick black hair. One humeral bristle, two pairs of scutellar; pleura mixed black-gray or red-yellow, one propleural bristle; mesopleura bare except two hairs below the disk, pteropleura bare, sternopleura with scars of two bristles (rubbed off); two or three hairs in front of them, the rest bare except between the coxae where there are two hairs and comparatively few bristles. Halteres red-yellow; abdomen red-yellow, sparingly haired, the segments with only median apical bristles. Legs red-yellow sparingly haired; fore femora with two dorsal and ventral rows of bristly hairs; mid femora with $3\frac{1}{2}$ rows of thick spines on the outside, the lowest row on the basal half, the longest on the apical half down the center; top row on the apical half. Mid tibia with nine apical spurs all

long but uneven; tarsus I with six and tarsus II with four pairs of setulae, a very long strong one inside the apex of tarsus I. All tarsi linear. Wings hyaline, costal spines of two sizes, much as in *pectinata*, but all rather short; veins yellow-brown, Sc and R and R₂+3 rather short. Small cross vein slightly beyond the middle of the discal cell.

Monotype, female, Yosemite Valley, California, May 22, 1908. The type will be in the collection of the Academy of Natural Sciences, Philadelphia.

The above insect has been compared with a female of *Eccoptomera simplex* from its type locality. In a recent letter, Dr. Aldrich informs me that the type of *Eccoptomera americana* he considers identical with *simplex* Coq., which thus has priority.

In a number of details the genus *Viatica* is much closer to *Eccoptomera* than it is to the *Leria* group, and seems to spring directly from *Pseudoleria* (*pectinata*).

Barbastoma barbatus Garrett.

Having compared the genus *Barbastoma* with *Anorostomoides*, it now seems advisable to give a description of the female *Barbastoma barbatus*, which at the time of describing I did not associate with it, but had temporarily placed it as possible *Anorostomoides petersoni* Mall. Through the kindness of Dr. Forbes and Dr. C. P. Alexander, I was able to examine the type of *petersoni*, my female proving distinct. Upon referring to the data I found that two specimens were captured near the same time and place as the type *B. barbatus*, seven days later. This fall I decided to try and obtain more, and was close to the same spot (perhaps 20 miles) and only succeeded in obtaining another female. But all things point to it being the female discussed. At the time of describing *barbatus*, I was struck by the beard. The females do not have any. The front fronto-orbital in the female is also slightly shorter than in the male, which then throws it into the second division of my key, where it runs to *Anorostomoides*. At the present time I have not fully decided if it should become a synonym of it. This may depend on whether *Anorostomoides* becomes a synonym

of *Crymobia*, which in a recent letter Dr. Aldrich informs me that he and Dr. Malloch think it should be.

Female. Head brownish, front red-orange, face red-yellow; one vibrissa, two rows of black hairs below it to the lower corner of the cheek, the long pale hairs of the male absent. Thorax, dorsum olive brown, six or seven dorso-centrals of different sizes, abdomen and pleura concolorous with the thorax. Fore tarsus I with no apical hook-like claw. Wing, the bump over the Sc less prominent, tip of R1 far beyond the small cross-vein, which is directly below the tip of Sc and about the center of the discal cell.

Notes on the male. This summer I found specimens of the male in the collection of the museum at Banff, Alberta, taken there, and can now say that it has six to eight dorso-centrals, variable in size. The color is the same as the female. When examining the type of *barbatus*, Dr. Aldrich sprung the fore leg and showed up the distinct apical claw-like hook at the tip of tarsus I which I had not observed. This is one of the generic characters of *Crymobia* Loew.

Plesiotypes, females, two, near the mouth of Coyote Creek, Sheep Creek, Wasa, British Columbia, October 21, 1919; one, Bentleys Siding, Rushmere, Windermere, B. C., November 15, 1922 (C. Garrett).

SOME SPECIAL FEATURES OF THE WINGS OF DIPTERA

PLATE I

By RAYMOND C. SHANNON

A number of features of the wings of Diptera, aside from the venation, have become of increasing importance in morphological and systematic work, and for this reason particular attention should be called to them.

EPAULET (= *tegula*—Snodgrass, Comstock, Crampton) Lowne & Parker. A small, usually hairy or bristly, more or less chitinized pad at base of costal vein. Considered a part

of the thoracic integument but formed as a scale-like pad overlapping the base of the costal, or more specifically, the basicosta. The bareness, pilosity or bristling, as well as the color, of the epaulet frequently offers good diagnostic characters in such groups as Tabanidae, Syrphidae and Muscoids. It is rudimentary or absent in a number of families, particularly in the Nematocera.

BASICOSTA (= subtegula; subepaulet—Parker). A more or less spear-head shaped structure immediately beyond the epaulet, i. e., between the epaulet and the basal end of costa. It appears to be morphologically a part of the costa and for this reason is given a name independent of the epaulet. At times it stands out as an isolated structure. The vestiture and color of the basicosta offer good characters between species in a number of families; e. g., *Lucilia caesar* and *sylvarum* have the basicosta black but *sericata* and *pilator* have it lemon yellow.

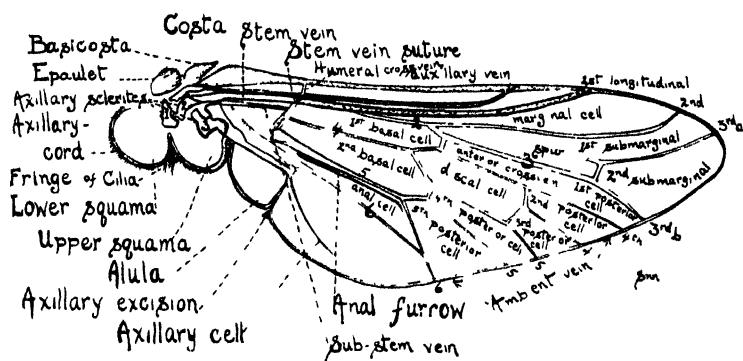
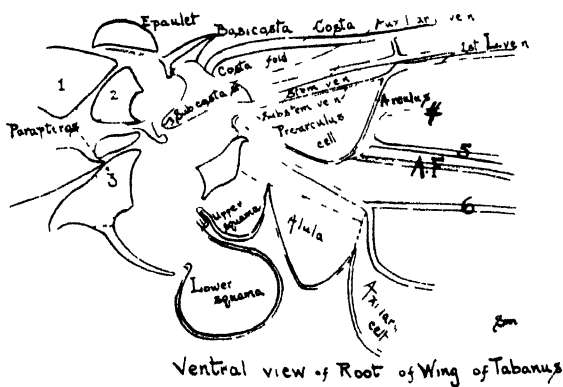
SUBCOSTAL SCLERITE. A more or less triangular structure on the lower side of the wing, probably produced by a general fusion of the bases of the upper veins. In *Tabanus* the outer margin is developed as a thin, plate-like expansion extending between the basicosta and base of the first vein which it partly overlaps. In the Muscoids it may bear small setae. In the Calliphoridae the genera with the stem vein ciliated have the axillary sclerite setose; those forms with bare stem vein have it merely pubescent. The color is sometimes of use.

STEM VEIN. The radius, or first longitudinal vein, is divisible into two sections, the basal section, or *stem vein*, which is separated from the rest of the first vein by a suture, usually easily apparent from the upper side. These two sections seem to be different in character. Pandellé discovered that the basal section only is ciliated in certain Muscoid genera and to distinguish it from the rest of the vein he called it the "souche commune" = stem vein, in which he is followed by Aldrich. On the other hand, the Tabanidae have the stem vein nude but the outer section of the first vein is setulose.

SETOSE VEINS. In many of the Orthorrhaphous families certain veins bear distinct setae of various sizes while in many

of the higher flies certain veins or sections of veins are setose. In the Tabanidae the setae are so characteristic of certain veins that the genera can to some extent be keyed on this character. The veins which may be setulose are the costa, auxillary vein, first vein and the basal section of the fifth vein, i. e., the vein bounding the posterior side of the second basal cell. The setulae on the other veins are always as well developed as those on the costa. The presence or absence of setulae on the auxillary vein divides the family into two nearly equal groups of genera. The Tabanidae in the National Museum collection were examined and it was found that the genera with bare auxillary vein belong to the group possessing hind tibial spurs, while those with the auxillary vein setose lack the hind tibial spurs. Furthermore, the following genera have the basal section of the fifth vein setose *Pangonia* (sparse), *Mycteromyia*, *Goniops*, *Apatolestes* (sparse), *Diachlorus* (three species, *ferrugatus*, *scutellata*, *curvipes*), were examined and all have the setulae extending beyond the basal section of the fifth vein. *Pelecorhynchus darwini* Ricardo, Chilean species, has the setulae reduced more than all the others, they being nearly absent on the first vein and the outer margin of the costal vein is bare. Moreover, this species has a distinct groove in the upper side of the base of the costa. Even a casual observation will show that many Nematocerous forms have similar setulae on certain veins.

SQUAMAL FRINGE OF CILIA. This is a well-known character but its presence or absence in various groups as well as its difference in appearance can be used to advantage in many cases where it has not been noticed.

Dorsal View of Wing of *Tabanus*.Ventral view of Root of Wing of *Tabanus*

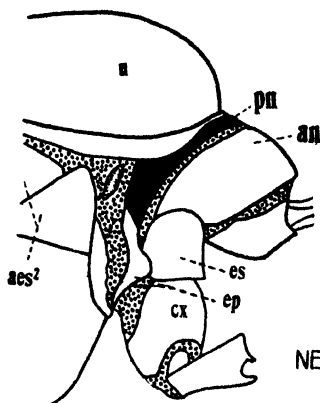


Fig. 1

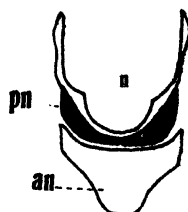


Fig. 2

NEOLIMNOPHILA ULTIMA

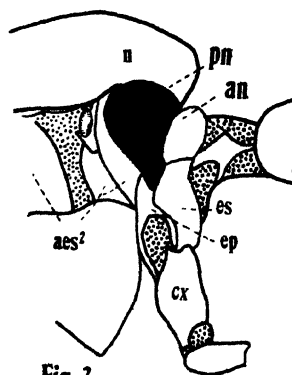


Fig. 3

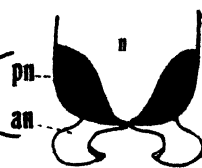


Fig. 4

DIXA CLAVATA

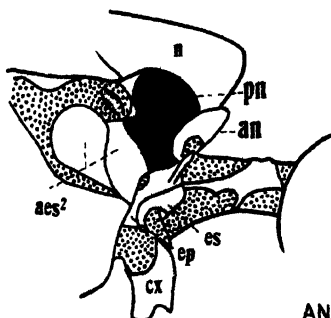


Fig. 5

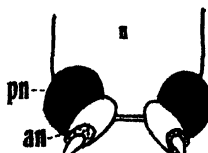


Fig. 6

ANOPHELES PUNCTIPENNIS

THE "PROEPIMERA" OF THE CULICIDAE

By STANLEY B. FREEBORN

The prothorax of mosquitoes although minute has considerable taxonomic value, for which reason it seems justifiable to call attention to an error in terms applicable to this part of the body. Dr. G. C. Crampton recently called the writer's attention to the fact that the so-called "proepimeron" of the mosquitoes is in reality a pronotal structure. Inasmuch as this sclerite figures prominently in taxonomic work on account of the "proepimeral" bristles that it bears, a study of the phylogenetic history of this plate was made which substantiates Dr. Crampton's assertion of its pronotal origin.

Although its presence in much the same form can be demonstrated in groups more primitive than the Diptera, a series of three dipterous specimens will indicate its undoubted pronotal origin.

In the tipulid figured (Pl. II, Figs 1, 2) it will be noted that the pronotum has become secondarily divided transversely into two sclerites—a posterior (pn) and an interior pronotum (an) which Snodgrass (Proc. U S N M, vol. 36, pp. 511-595) has called the scutum and scutellum of the pronotum. In other tipulids the division of the pronotum into an anterior and posterior portion is marked merely by a depression and the intervening membranous connection is missing, although the lateral extensions remain the same and both sections arch the dorsum in a true notal fashion.

In the family Dixidae, which is considered by some authorities as a subfamily of Culicidae, we find an intermediate step between the dorsal position of the sclerite in question in Tipulidae and the lateral position of Culicidae. In this group (Pl. II, Figs. 3, 4) the anterior pronotum (an) has lost the broad, strap-like appearance found in the Tipulidae and is compressed into two lobe-like structures narrowly connected medianly. The posterior pronotum (pn) has been pressed laterally and posteriorly to a humeral position encroaching on the mesonotum (n) but with the lateral parts united medianly under the peak of the mesonotum.

In the Culicidae the pronotum has become more widely divided dorsally (Pl. II, Figs. 5, 6). The anterior pronotum (an) is represented by the prothoracic lobes which are distinctly lateral in most genera, although they are sometimes approximate or connected dorsally by a narrow chitinous strip. The posterior pronotum (pn), although occupying the same relative position as noted for *Dixa*, has lost its median dorsal connections and has become frankly lateral, a fact that caused Snodgrass in the Monograph of Howard, Dyar and Knab to call it the proepimeron despite its definite homology with the sclerite of the pronotum which he had previously called the scutellum of the pronotum.

The true proepimeron (ep) in all of these cases cited occurs in its normal position caudad to the proepisternum (es).

The terms "scutum" and "scutellum" as applied to the homologous sclerites in Tipulidae are inapplicable even in the Tipulidae as the line of division separates parts that are not homologous with the true scutum and scutellum of the mesonotum. The term "pronotal lobes" as applied to the homolog of the posterior pronotum in Tabanidae is an expressive and correct term but is inapplicable in the Culicidae on account of the confusion that would arise between these lobes and the anterior pronotum which is commonly called the "prothoracic lobes." "Humeral lobes" would be applicable to the sclerites of the posterior pronotum in Culicidae and Dixidae, although it carries no implication of pronotal origin and it would have little significance in the Tipulidae where the bands extend across the dorsum. The term "postnotum" is synonymous with "postscutellum" and consequently inapplicable. It appears, therefore, that to be correct and at the same time appropriate we must revert to the cumbersome name of posterior pronotum or posterior pronotal plates.

Lateral (Pl. II, Figs. 1, 3, 5) and dorsal (Pl. II, Figs. 2, 4, 6) views with the posterior pronotal plates in solid black for comparison. Mesonotum, *n*; posterior pronotum, *pn*; anterior pronotum, *an*; proepimeron, *ep*; proepisternum, *es*; anepisternum, *aes*²; coxa, *cx*.

THE MOSQUITOES OF COLORADO

(Diptera, Culicidae)

By HARRISON G. DYAR

I have shown in discussing the mosquitoes of the Yellowstone National Park that the Canadian fauna follows the mountain crests into Wyoming. It extends also into Colorado along the 7,000 foot level, not much below that. Collections were made at Grand Lake in the early spring of 1923, and I was fortunate enough to arrive before the Public Health Service had completed its extermination work. These mountain mosquitoes are so easy to destroy that it seems almost like taking an undue advantage of nature. Certainly the able and sharp-eyed man who had been employed to spread oil on the pools left little enough for a late collector.

The existence of the Canadian fauna in the higher altitudes of Colorado has not been fully realized. Professor T. D. A. Cockerell published a list of the mosquitoes of the State (Journ. Econ. Ent., xi, 195-200, 1918) in which only two or three species of the Canadian fauna are included. For comparison, this list is reproduced, Wyoming localities omitted, and some of the determinations commented upon.

Anopheles quadrimaculatus Say. Only from the western border of the State. The determination is uncertain until verified by a male. The specimens mentioned from Hotchkiss and Delta in the Monograph (Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iv, 1032, 1917) cannot now be found.

Culex tarsalis Coquillett. "Common up to about 6,000 feet."

Culex pipiens Linnaeus. "Recorded from Denver by Tucker in 1907." The identification was wrong. In the Monograph a second error was made, the specimen having been transferred to *Culiseta inornatus* (Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iii, 493, 1915). The specimen still exists in the National Museum collection, being a male of *Aedes trivittatus* Coq., a species not otherwise in Cockerell's list. It is an inhabitant of flood-pools along rivers at low altitudes.

Theobaldia inornata Williston. Said to range from 5,000 to

9,800 feet, but I think some confusion has occurred, as the material collected by me at the higher levels comprised only *Culiseta impatiens* Walk. as specified below.

Theobaldia incidens Thomson. Recorded only from the western part of the State.

Aedes pullatus Coquillett (*acrophilus* Dyar). "It is a mountain species in Colorado, belonging especially to the Canadian Zone."

Aedes aldrichi Dyar & Knab. Recorded from Boulder. This may be the form of *idahoensis* with dark veins referred to below. The species cannot be recorded from Colorado without further confirmation.

Aedes curriei Coquillett. "Common at lower altitudes in Colorado."

Aedes idahoensis Theobald. "In Colorado, *idahoensis* is of the Transition and Canadian Zones."

Aedes mimesis Dyar. "A species of the higher mountains." This is the western form of *fitchii*.

Aedes nigromaculis Ludlow. "A species of the plains."

Aedes sansoni Dyar & Knab. The types of *sansoni* were a mixture of *fitchii* (*mimesis*) and *excrucians*, restricted by me to the latter. Both these species occur in the Canadian Zone as specified below and are probably mixed under *sansoni*. See also *hewitti* and *mutatus*.

Aedes stimulans Walker. Not known to occur in Colorado. The record should be cancelled.

Aedes vexans Meigen. "Very common at lower levels."

The following is a record of the species collected at Grand Lake and vicinity, 8,000 to 10,000 feet, to which is added Cockerell's records not otherwise included, making a list of the known mosquitoes of Colorado.

As compared with my captures in Wyoming (Ins. Ins. Mens., xi, 36-46, 1923), five species are omitted, *Aedes hirsuteron*, *spencerii*, *canadensis*, *diantaeus* and *cacothius*, while three are added from Cockerell's list, *Anopheles quadrimaculatus*, *Aedes trivittatus* and *Culiseta incidens*, and two from my captures, *Culiseta impatiens* and *Aedes riparius*.

Anopheles quadrimaculatus Say.

Recorded from western Colorado. The species actually present may be *maculipennis* Meig., males being necessary to decide.

Aedes fitchii mimesis Dyar.

The larvae were found at Grand Lake, breeding in grassy marshes and in a small pond near Columbine Lake where they were scattered about in the middle of the shallow water. The first adults appeared June 17. The commonest of the ring-legged *Aedes*.

The name *mimesis* is based on males from Drummond, Montana. At the time, larvae of *excrucians* from Kaslo, British Columbia, were wrongly associated (Ins. Ins. Mens., v, 116, 1917). Later (Ins. Ins. Mens., viii, 15, 1920), I showed the development of the form westward, and associated the correct larva from Dawson, Yukon Territory. Finally (Ins. Ins. Mens., viii, 117, 1920), I associated *mimesis* as the western race of *fitchii*. Relying on the supposed weakness of the basal hypopygial spine in *mimesis*, I stated (Ins. Ins. Mens., xi, 40, 1923) that adults from the Yellowstone National Park were true *fitchii* and not the form *mimesis*. The larvae were not at hand in that instance or it would have been evident that the form was *mimesis*. The weakening of the spine in the western form is slight and not diagnostic. The lengthening of the claspette filament is a more reliable character; but the male genitalic differences between *fitchii* and *mimesis* are weak at best.

Aedes riparius Dyar & Knab.

Larvae agreeing with those of this species were found in a pool near Columbine Lake, June 2, 1923, but no adults were secured. They occurred with *excrucians* and others. I think there can be no doubt of the identification of this characteristic larva.

Aedes increpitus hewitti Hearle.

This is the *mutatus* of my Yellowstone Park list and was not met with by me in Colorado. It occurs, however, being re-

corded by Cockerell under "*sansoni*" as "Here also a small variety which looks distinct." His locality was Crystal River near Red Stone. Specimens of this form are in the National Museum as follows:

COLORADO: Crystal River above Red Stone, July 27, 1917 (P. Andrews).

Florissant, July 4, — (T. D. A. Cockerell).

Florissant, June 26, 1907 (S. A. Rohwer).

***Aedes increpitus mutatus* Dyar.**

The larger form inhabiting the river valleys in dry plains.

COLORADO: Modern (between Denver and Boulder), May 28.
— (T. D. A. Cockerell).

Mr. Hearle has lately proposed (Can. Ent., iv, 265, 1923) to unite *hewitti* and *mutatus* on the ground of absence of genitalic differences. I can detect no larval differences either; but *hewitti* is uniformly smaller, and inhabits the upper river valleys in the mountains. In the present paper the forms are separated in this sense. Probably the two will be found to run together at intermediate levels; but there seems to be an incipient differentiation here, for which the two names may be used if desired.

***Aedes excrucians* Walker.**

Found in the Grand Lake region, almost as common as *mimesis*. A typical male was mounted, collected above the East Inlet, June 21, 1923, and larvae were found in a pool near Columbine Lake, June 2, 1923.

***Aedes punctor* Kirby.**

Not uncommon about Grand Lake, the male hypopygium and larvae normal. The species occurred also at Poudre Lakes, 10,740 feet, breeding in pools in a sloping meadow recently vacated by the snow banks and still overrun with water from the melting snow. With it were associated larvae of *Aedes pullatus*, whose occurrence is normal in such a situation. The situation is distinctly unusual for *punctor*; but no differences are observable in male structures or larvae. The adults have

the mesonotum entirely brown, as in *punctodes* from northern Alaska. Male mounted, Grand Lake, June 19, 1923; twelve specimens from Poudre Lakes, July 4-8, 1923.

***Aedes idahoensis* Theobald.**

Found breeding in pools in a grassy meadow at Grand Lake early in the season with *cataphylla* and *impiger*. The larvae agree with my description (Ins. Ins. Mens., v, 187, 1917), but the adults have the second and fourth veins only slightly paler than the third, thus resembling *aldrichi*, *hirsuteron* or *cacothius*. From the first two it differs in the larva, that of *hirsuteron* while having spicular skin, has a much larger comb, and the air-tube is shorter and without detached teeth of the pecten. *Aldrichi* is even more dissimilar, and has a different habit, frequenting large flood-pools. In comparison with *cacothius*, it is somewhat larger, while the mesonotal markings do not correspond, being the usual double brown band on a yellowish gray ground, whereas *cacothius* has a dark grizzled appearance with the lines narrow and illy contrasted. Specimens were also taken, wing-veins all dark, as follows:

COLORADO: Granby, June 26, 1923 (H. G. Dyar).

Fraser River, June 26, 1923 (H. G. Dyar).

***Aedes communis* DeGeer.**

The commonest species about Grand Lake out of doors. The first adult was taken flying June 3. The larvae were abundant in low-lying grassy pools about the lake and in the edges of small ponds. Also in great numbers in a single pool near the river. (North Fork of the Colorado) below Camp Wheeler. The bred adults are almost uniformly of the normal *lazarensis* marking.

***Aedes pionips* Dyar.**

The larvae were found in a succession of small ponds for five miles up the valley of the East Inlet of Grand Lake. *Communis* bred out earlier in the edges of these ponds and after they were gone the large *pionips* larvae could be found scattered in the deep water. They were accompanied by num-

bers of the larvae of *Corethra* which, however, did not seem to molest the fully grown larvae. Adults of *pionips* began to emerge after the middle of June.

***Aedes cataphylla* Dyar.**

The earliest species on the wing at Grand Lake, the adults in May. The larvae occurred in most of the pools, but especially the open ones in grassy meadows filled by snow-water. A pupa was taken from a pool at Fraser, Colorado, the adult appearing May 31, 1923.

***Aedes impiger* Walker.**

With *cataphylla* at Grand Lake in larger proportion and a little later in emergence on the average. Larvae in late pools were mostly *impiger*, the usual proportion between these species being reversed. Adults of *impiger*, last of May and first of June.

***Aedes dorsalis* Meigen.**

Recorded by Cockerell from lower altitudes (as *currici*). Absent at Grand Lake (8,000 feet).

***Aedes pullatus* Coquillett.**

Occurring at various places about Grand Lake mixed with other species in lesser proportion, at the highest altitudes occurring alone (except for a form of *punctor* referred to under that heading).

COLORADO: Estes Park Village, June 24, — (T. D. A. Cockerell).

Camp Wheeler, June 25, 1923 (H. G. Dyar).

500 feet above Camp Wheeler, larvae June 15, 1923 (H. G. Dyar).

Poudre Lakes, 10,740 feet, July 8, 11, 1923 (H. G. Dyar).

***Aedes intrudens* Dyar.**

The larvae occurred early in grassy pools fed by snow-water. The adults were fairly abundant and made themselves very conspicuous by being the only mosquito to enter the houses.

Dates of emergence at Grand Lake, May 31 to June 6; adults taken through June.

Aedes trivittatus Coquillett.

COLORADO: Denver, August —, — (E. S. Tucker) (2 ♂♂), originally recorded as "*Culex pipiens*" and again as "*Culiseta inornatus*."

Aedes nigromaculis Ludlow.

Recorded by Cockerell from the plains. Absent at Grand Lake.

Aedes vexans Meigen.

Recorded by Cockerell from low altitudes, not reaching Grand Lake.

Aedes cinereus Meigen.

Occurring at Grand Lake in most of the pools after the other mosquitoes had nearly all emerged. The first adults were obtained on July 3, 1923.

Culiseta incidens Thomson.

Only one record is known to me, viz:

COLORADO: Plateau Canyon below Mesa, 30 miles east of Grand Junction (7,000 feet), August 23, 1906 (E. P. Taylor).

Culiseta inornatus Williston.

Recorded by Cockerell up to 10,000 feet, but not met with by me at Grand Lake. I have the following records:

COLORADO: Florissant, June 20, 29, 1907 (S. A. Rohwer).

Boulder, September —, — (T. D. A. Cockerell).

Cochetopa National Forest, July 11, 13, 1911 (A. K. Fisher).

Mt. Carbon, June 26, 1910 (C. D. Marsh).

Culiseta impatiens Walker.

Common at Grand Lake and very conspicuous by flying early before any other mosquitoes have appeared. Specific dates of

capture, May 23 to June 22, 1923. The larvae appeared in permanent pools, usually dark and cold, much preyed upon by larvae of *Eucorethra*. Also the following record:

COLORADO: Whittier Range, Cochetopa National Forest, July 9, 1911 (A. K. Fisher).

***Culiseta alaskaensis* Ludlow.**

Two adults were captured at Grand Lake, May 24 and 30, 1923.

***Culex tarsalis* Coquillett.**

Recorded by Cockerell as common at low altitudes, not reaching Grand Lake. I have the following exact records:

COLORADO: Grand Junction, July 23, August 26, 28, 1906 (E. P. Taylor).

Boulder, August —, November 15, — (T. D. A. Cockerell).

Denver, August —, — (E. S. Tucker).

NEW CULEX FROM PANAMA

(*Diptera, Culicidae*)

BY HARRISON G. DYAR AND RAYMOND C SHANNON

***Culex (Choeroporpa) dornarum*, new species.**

A small black *Culex*, the male palpi exceeding the proboscis by the length of the last joint; wing-scales on the forks of the second vein ovate, but not very broadly so; flat scales on the occiput, black, mixed with whitish; no light markings visible on body or legs, the coloration in general similar to other species of the subgenus.

Male hypopygium. Side-piece curved, conically tapered outwardly; clasper swollen on outer third, with snout-shaped termination; spine appendiculate; dorsal declivity very minutely pilose. Inner division of lobe of side-piece furcate, with two long distorted filaments, the inner one arising basad of the outer from a shorter arm. Outer division with four filaments on outer aspect, a blade-shaped one at the base of the short inner arm, which bears a long hooked filament and a short one. First mesosomal plate short, with furcate tip, the arms both long, slender and pointed; second plates exceeding

them, with spatulate tip; tenth sternites rather short, with comb-shaped tip of about 12 teeth; ninth tergites small, fan-shaped, setose.

Type, male, Sweet Water Reservoir, Fort Sherman, Canal Zone, Panama, September 5, 1923 (R. C. Shannon); paratype, male, Fort Sherman, Canal Zone, December 15, 1920 (J. B. Shropshire, through C. S. Ludlow).

Near *elevator* D. & K., but the mesosomal plate with sharp pointed arms instead of rounded plate-like ones.

Named for Mrs. Adam Dorn and Miss Annie Dorn, whose kind hospitality at Gatun the writers well remember.

Culex (Choeroporpa) conspirator Dyar & Knab.

This species was described from Mexico and Salvador, but though most of the Panama records given in the monograph are incorrect, the species does occur in Panama as shown by the senior author (Ins. Ins. Mens., xi, 69, 1923). To the synonymy *dysmathes* D. & L. = *pasadaemon* Dyar, we must now add *merodaemon* Dyar, as the senior author has convinced himself that the structures described under this name are not in reality different, but simply in a different position.

The junior author made collections in the Cardenas River at Fort Clayton, Canal Zone, at the end of the dry season, April, 1923. The river at this point runs over stones, is well shaded, and at the time visited was low. Little bays or pools along the edge, full of leaves, driftwood and algae furnished the collections. Several species of *Anopheles* were present and several species of *Choeroporpa*, among them *conspirator*. We have the species from both the Pacific and Atlantic sides.

Culex (Choeroporpa) fatuator, new species.

This form has been confused with *conspirator* and occurred with it in the Cardenas River mentioned above. The adults are essentially similar to *conspirator*, but in the male hypopygium the points of the mesosomal plate are sharp, and project laterally parallel to each other. Type, male, Cardenas River, Canal Zone, Panama, April, 1923 (R. C. Shannon).

One of the "types" of *dysmathes* D. & L. (the original specimen on which the determination as "new" was made by

Doctor Dyar) is this species, but it is not a specimen from which the description was drawn up, not agreeing therewith, and therefore the name cannot be used for this form. A series before us, Chagres River, June 7, 1907 (A. Busck) belongs to *fatuator*.

Culex (Choeroporpa) cuclyx, new species.

Palpi exceeding the proboscis by the length of the last joint, both black scaled. Head with flat scales reaching well up the sides, replaced by narrow ones at the vertex, white, or with a strong white reflection, mixed with black ones; forked black scales on the nape. Mesonotum with rather coarse bronzy brown scales. Abdomen black scaled with white basal segmental bands above, not reaching the sides; venter blackish. Wing scales rather broadly elliptical, more narrowly so on the bases of the fork of the second vein. Tarsi unbanded.

Male hypopygium. Outer division of the lobe with a thick inner arm, bearing a long filament with hooked tip and a shorter one; four flattened filaments arising in a group from a rounded projection at base of stem, without leaf, the structure much as in *epanastasis* Dyar (Ins. Ins. Mens., x, Pl. V, fig. 5, 1922), except that the outer arm is rudimentary. Inner division short, of two fused cones, the inner one shorter, each bearing a long filament with flattened pointed tip; the two arms are not really apart, yet the structure so nearly approaches normal that it will be preferable to list the species under the heading "inner division of the lobe of side-piece with the arms apart." Tenth sternites long, with flattened comb-shaped tips. Mesosomal plate with a third point, subapical, the upper limb short and pointed, the lower long, parallel-sided with rounded tip, directed laterally, the third point sharp and parallel to it. Ninth tergites large, elliptical, broad, approximate at base and diverging, setose.

Type, male, Cardenas River, Fort Clayton, Canal Zone, Panama, April, 1923 (R. C. Shannon).

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UNDESCRIBED SPECIES OF NEMATOCERA FROM JAPAN

(*Diptera*)

By CHARLES P ALEXANDER

The new species of *Diptera* described in this paper were included in material sent to me by my friends, Prof. Teiso Esaki and Dr. Tokuichi Shiraki. With the exception of the Formosan *Ptychoptera*, the flies were taken in the mountainous sections of central Honshiu by Professor Esaki. The two genera, *Bittacomorphella* and *Diomonus*, are of especial interest in that all of the species known hitherto are Nearctic. The types are preserved in the writer's collection through the kindness of the collectors.

Family PTYCHOPTERIDAE

Ptychoptera formosensis, new species

Male —Length 8.4 mm.; wing 8.6 mm.

Frontal prolongation of head and the palpi pale brownish yellow, the distal segments of the latter a little darker. Antennae with the scape and base of the first flagellar segment yellow, the remainder of the flagellum brownish black. Vertex and occiput broad, shiny blue-black.

Mesonotum deep black, the praescutum with deep, longitudinal impressions; scutellum reddish yellow; postnotum blue-black. Pleura and pleurotergites of postnotum light yellow. Halteres brown. Legs with the coxae light yellow; trochanters light yellow; femora obscure yellow, the tips narrowly darkened; tibiae pale brown, the tips narrowly darker; tarsi brown.

Wings with a faint grayish tinge, the costal and subcostal cells more yellowish; two very narrow cross-bands, one along the cord extending from R to midlength of Cu_2 , the second band more oblique, slightly interrupted, extending from the stigma at the tip of R_1 to the fork of M . Wing-surface with the macrotrichiae extensive, in the basal cells extending almost to the base. Venation: Rs shorter than $r-m$, the latter subequal to $m-cu$ and in alignment; abortive anal vein conspicuous and with macrotrichiae.

Abdomen orange-yellow; tergites two to six with the caudal margins broadly black; segments seven and eight black; hypopygium orange; sternites uniformly dull orange. Male hypopygium large, the ninth tergite profoundly incised, the lateral lobes being very long, digitiform, their tips directed ventrad across the genital chamber.

Habitat.—Japan (Taiwan).

Holotype, ♂, Funkiko, April 25, 1917 (T. Shiraki).

The present species is most closely related to *P. annandalei* Brunetti (India). I am indebted to Dr. Annandale for the privilege of studying one of the type males of the latter species. The following supplementary notes on *P. annandalei* may be supplied:

The coloration of the mesonotal praescutum is brilliant metallic blue with decided opalescent reflections; the anterior part of the postnotum with a large circular light yellow area with opalescent reflections. Venation with the deflection of R_{4+5} short to subobsolete, $r-m$ being correspondingly lengthened; cell R_4 much shorter in proportion to the length of its petiole (R_{4+5}) than in *formosensis*.

The ninth tergite is very short at its base, the lateral lobes being greatly prolonged into slender, digitiform pale lobes that are slightly enlarged at their distal ends and here provided with black setae. Dististyle complex, consisting of a flattened blade whose dorsal inner edge is provided with a broad margin of short, blackened teeth, the ventral distal angle produced laterad and caudad into a pale, fleshy clavate lobe that is provided with several coarse, erect bristles; mesal face of this blade, near

the base, produced mesad into a subconical lobe that is provided with short setae, especially on the cephalic face and near the apex. Ninth sternite appearing as two stout reddish brown lateral lobes, the truncate apex of each densely provided with light yellow appressed silken setae, the caudal face with a dense pencil or fascicle of black setae directed mesad and caudad, not quite contiguous across the mid-line; notch between the lobes U-shaped; back of this notch a median lobe that is slightly widened distally, the apex truncate. Aedeagus conspicuous, subtended on either side by a small chitinized apophyse, which terminates in a small point directed ventrad and laterad.

In *P. formosensis*, the tergite is generally similar but the dististyle and ninth sternite are entirely different in structure, the chitinized lobes being replaced by silken yellow setae.

***Bittacomorphella nipponensis*, new species.**

Female.—Length 10–11 mm.; wing 7.5–9.4 mm.

Rostrum silvery; palpi pale yellow. Antennae setaceous, black throughout. Head black, the front, anterior part of vertex and the orbits silvery white.

Mesonotal praescutum and scutum black, the lateral margins broadly silvery; scutellum brown; postnotum pale brownish silvery. Pleura blackish, heavily silvery pruinose. Halteres long, pale, the knobs infuscated. Legs with the fore coxae blackened, the remaining coxae and the trochanters reddish yellow; femora pale basally, passing into brownish black at the tips, the fore and middle femora only narrowly pale basally, the posterior femora with only the tips darkened; tibiae black, hairy; basitarsi black, the apical two-fifths (fore leg), one-third (middle leg) or one-fifth (posterior leg) snowy-white; tarsal segments two and three snowy-white; terminal two segments abruptly narrowed, brownish black. Wings gray, the small stigma pale brown; extreme base of wing faintly yellowish; veins black. Macrotrichiae very sparse, confined to the extreme outer margins of cells Sc_1 , R_3 and R_4 . Venation about as in *B. sackeni*.

Abdomen dark brown, the caudal margins of the segments

narrowly paler; terminal abdominal segments with appressed silvery pubescence.

Habitat.—Japan (Honshiu).

Holotype, ♀, Hinoemata, Iwashiro-no-kuni, altitude 4,000 feet, July 24, 1923 (T. Esaki); flying near surface of mountain stream.

Paratype, ♀, Ozenuma, on boundary between Iwashiro-no-kuni and Kotsuke-no-kuni, altitude 6,545 feet, July 26, 1923 (T. Esaki).

Bittacomorphella nipponensis is most closely related to *B. sackeni* (Röder) of western North America, from which it differs notably in the great reduction in number of macrotrichiae in the cells of the wing. In *sackeni* these include the entire distal sixth of the wing.

Family BLEPHAROCERIDAE

Blepharocera esakii, new species.

Male.—Length about 8.5 mm.; wing 9.8 mm.

Labrum shiny black, the maxillary palpi and remaining mouthparts pale brown. Antennae black throughout. Front light gray pruinose; remainder of the head darker gray.

Pronotum light gray. Mesonotum gray with three dark brown stripes, the median stripe broad and indistinctly bisected by a capillary pale line; an incomplete transverse suture, extending mesad to the mesal edge of the lateral praescutal stripes; scutal lobes dark brown, the median area light gray pruinose; scutellum light gray, the caudal margin broadly black; postnotum very short, gray pruinose. Pleura light gray pruinose. Halteres obscure orange-yellow throughout. Legs with the outer faces of the coxae more or less darkened, the inner faces of the mid-coxae and trochanters with dense black setae; femora and tibiae obscure yellow, the tips broadly dark brown; tarsi dark brown. Wings subhyaline, the extreme base conspicuously light yellow; costal margin narrowly tinged with pale brown; veins black; *Cu* and its branches paler on basal half. Venation: *Rs* long, fully five to six times the basal deflection of *R*₄₊₅.

Abdominal segments grayish brown, the basal tergite clearer gray, the extreme caudal margins of the segments pale.

Habitat.—Japan (Honshiu).

Holotype, ♂, Mt. Takao, Musashi-no-kuni, altitude about 500 feet, May 7, 1922 (T. Esaki); beside a stream in dense forest.

This interesting *Blepharocera* is named in honor of the collector, my friend, Prof. Teiso Esaki. *B. shirakii* Alexander is readily told from the present species by its general black coloration and smaller size.

Family MYCETOPHILIDAE

Macrocera ephemeræformis, new species.

Male.—Length about 9.5 mm.; wing 8.4 mm.; antenna 27 mm.

Front and palpi brownish black. Antennae very long, as shown by the measurements; basal segment of scape glabrous, obscure yellow basally, the apex blackened; second segment very short; basal segment of flagellum brown on basal third, the apex yellowish white; succeeding flagellar segments with the basal third black, the apex yellowish, the amount of black becoming further reduced on the intermediate and terminal segments. Head black.

Mesonotum light brown, sparsely yellowish pollinose, with three conspicuous shiny black stripes; scutellum and postnotum chiefly dark brown. Pleura black, the region surrounding the wing-root light brown. Halteres testaceous, the knobs yellow. Legs with the fore and middle coxae obscure yellow, the anterior face more infuscated; posterior coxae largely brown; trochanters brownish yellow; fore femora brown, near the apex with a conspicuous subterminal spine; posterior femora yellow; remainder of legs passing into brown. Wings grayish subhyaline, the costal region variegated with bright yellow and brown, the markings alternately arranged; the brown marks include conspicuous seams at *h*; tip of *Sc*₁; tip of *R*₁; arculus; origin of *Rs*; a large blotch at fusion of *R* and *M*, continued caudad as a paler cloud along vein *Cu*₂ almost to the wing-margin; a spot on *R*₄₊₅ opposite to and nearly confluent with

the area at R_1 ; on R_{2+3} and a conspicuous apical cloud continued back along vein R_{4+5} ; veins yellow, brown in the infuscated areas; a very small paler brown cloud at tip of vein Cu_1 but none at tips of the medial veins. Anal angle of wing square, more so than in any described species of the genus. Venation: Petiole of cell M_2 fully one-half R_{2+3} ; fusion of M and Cu_1 relatively extensive, about two-thirds the section of M beyond it.

Abdomen with the basal five segments obscure yellow, the caudal margins of the segments conspicuously blackened; terminal segments and hypopygium uniformly blackened.

Habitat.—Japan (Honshiu).

Holotype, ♂, Mountains near Kawamata, Shimotsuke-no-kuni, July 24, 1923 (T. Esaki).

This remarkable fungus-gnat is the largest species of the genus known to the writer. In its general appearance it differs so strikingly from the Nearctic species of *Macrocera* that it might appear that a new genus is necessary for its reception. The Oriental *M. alternata* Brunetti, however, appears to form a connecting link between the groups. The anal angle of the present species is practically rectangular. The specific name was suggested by Professor Esaki, the fly presenting a curious resemblance to certain may-flies, as *Heptagenia* and *Ephemera*.

***Diomonus esakii*, new species.**

Male.—Length 11.5 mm.; wing 11.4 mm.

Female.—Length 11 mm.; wing 10.2 mm.

Rostrum and palpi black. Antennae black, the terminal six segments abruptly yellowish white. Head shiny black, the yellowish ocelli placed in almost a transverse line, the median one a little smaller than the laterals.

Thorax entirely coal-black, with short, delicate black pile. Halteres black, the extreme base of the stem a little brighter. Legs with the coxae black, very slightly pruinose; trochanters and extreme bases of femora yellow; remainder of legs black, the terminal tarsal segment a little paler; no spine on mid-femur. Wings subhyaline, the costal margin more yellowish; apical fourth of wing uniformly infuscated; an irregularly

circular brown cloud in the bases of cells R_3 and R_5 and a conspicuous wash at the end of vein Cu_2 ; veins brown, darker in the clouded areas. Venation: Sc_1 ending some distance beyond the origin of R_3 , Sc_2 immediately before this origin in the female, far before in the male; cell R_2 very tiny, subquadrate in the female, completely obliterated in the male; tip of anal vein atrophied.

Abdomen black.

In the female, the basal tarsal segments are paler than in the male and the abdomen shows faint bluish reflections.

Habitat.—Japan (Honshiu).

Holotype, ♂, Yumoto, Shimotsuke-no-kuni, altitude 5,820 feet, July 23, 1923 (T. Esaki).

Allotopotype, ♀.

This beautiful and striking fungus-gnat is named in honor of the collector, Professor Esaki. The previously described species of *Diomonus* are all Nearctic. The obliteration of cell R_2 in the type male is presumably an abnormality of the specimen. Such individuals would run to the subfamily Mycetophilinæ. The nearest ally of *D. esakii* is the genotype, *D. nebulosus* Walker.

UNDESCRIBED RHOPALOCERA FROM JAPAN AND FORMOSA

(*Lepidoptera, Nymphalidae and Satyridae*)

By TEISO ESAKI AND WARO NAKAHARA

Polygonia c-aureum lunulata, new subspecies (Plate III, Fig. 1).

Resembles *c-aureum* Linnaeus very closely, but the wavy submarginal black line of both wings, upperside, narrower, and the series of brownish yellow lunules inside of this line very much larger, more clearly defined, and lighter in color.

Length of body, one-third inch; expanse of wings, 2 inches.

Habitat: Formosa.

Holotype: ♂, Musha, Formosa, August 15, 1921 (Teiso

Esaki); paratype: ♂, Horisha, Formosa, June 28, 1919 (K. Asakura). Holotype in the collection of Esaki; paratype in that of Nakahara.

Lethe callipteris diluta, new subspecies (Fig. 3, male; Fig. 4, female).

Differs from *callipteris* Butler by its lighter coloration: all the yellowish spots more clearly brought out, and the amount of the general dark suffusion greatly reduced; the postdiscal series of yellowish spots markedly enlarged; the dark transverse streak across the discal cell of forewing more prominent; the scalloping of the outer margin of hindwing more pronounced.

Length of body, three-fourths inch; expanse of wings, 2 (♂)–2¾ inches (♀).

Habitat: Hokkaido, Japan.

Holotype: ♂, Sapporo, Hokkaido, August 17, 1922 (Teiso Esaki); allotopotype: ♀; paratopotypes: 2 ♂'s and ♀. Holotype and allotopotype in the collection of Esaki; paratopotypes in that of Nakahara.

Lethe callipteris* ab. *suffusa, new aberration (Figs. 5 and 6).

A melanic aberration belonging to subsp. *diluta*; outer half of both wings, on both sides, strongly suffused with dark, largely obliterating yellowish spots situated in these areas.

Length of body, five-eighths inch; expanse of wings, 1½ inches.

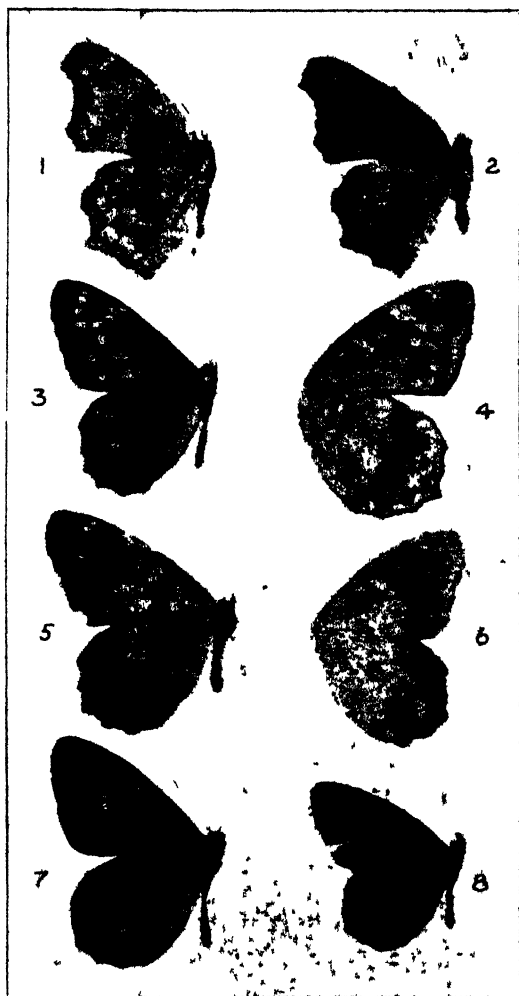
Habitat: Hokkaido, Japan.

Holotype: ♀, Sapporo, Hokkaido, August 17, 1922 (Teiso Esaki). Type in the collection of Esaki.

Lethe callipteris minima, new subspecies (Fig. 8).

A small northernmost race with light coloration as in *diluta*; forewing somewhat narrower; the series of submarginal black spots on the upperside of hindwing smaller; the outer margin of hindwing produced at the end of veins into sharp points.

Length of body, five-eighths inch; expanse of wings, 1¾ inches.



EXPLANATION OF PLATE

- 1 *Polygona c aurum lunulata* new subspecies Holotype
- 2 *Polygona c aurum c aurum* Linnaeus, ♂ from Japan proper
- 3 *Icthy callipteris diluta*, new subspecies Holotype
- 4 Do allotype, underside
- 5 *Icthy callipteris ab suffusa* new aberration Holotype
- 6 Do, underside
- 7 *Icthy callipteris callipteris* Butler, ♂, from Japan proper
- 8 *Icthy callipteris minima* new subspecies Holotype

Habitat: Saghalien.

Holotype: ♂, Kumasasatōge, Saghalien, July 28, 1922 (Teiso Esaki); paratopotypes: 2 ♂'s. One paratopotype in the collection of Nakahara; other types in that of Esaki.

AMERICAN REFERENCES IN THE CATALOGUE OF INDIAN CULICIDAE

(Diptera)

By HARRISON G. DYAR

Of the recent catalogues of Indian insects being issued by the Government of India, Part 2 covers the Culicidae, by Ronald Senior-White. Without attempting any criticism of the main object of the work, some incidental references to American mosquitoes require notice.

Aëdeomyia squamipennis Lynch Arribalzaga.

This is recorded as an Indian species (page 48), but erroneously. *Catasticta* Knab is the only Oriental member of the genus, the references to *squamipennis* as Oriental being based on misidentifications.

Heteronychia Lynch Arribalzaga.

This is given as a synonym of *Aedes* Meigen (sensu strict.), and the type is stated to be *Culex acstuanus* Wied. (as *dolosa* Arrib.) (page 52). As Mr. White gives the subgenera of *Aedes* (sensu lat.) full generic rank, this is a misplacement. He should have given *Heteronychia* under *Ochlerotatus*, as to which it has priority. That is assuming that the reference by Howard, Dyar and Knab of *Heteronychia* to *Aedes* is correct. This seems the only interpretation possible from the description; but Doctors Barbarà and Petrocchi of Buenos Aires have contended to me that they feel sure that Lynch described as *Heteronychia dolosa* a common *Culex* of the region, *Culex bonariensis* Brèthes, and that his description of the claws of the female as toothed was the result of an error. They think he confused his slides. I accepted this determination on other

grounds (Ins. Ins. Mens., ix, 150, 1921). Later, in the Mosquitoes of the United States, I reverted to the position taken in the monograph, and published some additional remarks on the subject (Proc. U. S. Nat. Mus., xlii, 3, 1922), which is still far from clear. In any event the placing of *Heteronychia* under *Aedes* Meig. (sensu strict.) is incorrect, and the type is *dolosa* Arrib., but not *aestuans* Wied. (= *quinquefasciatus* Say).

***Aedes* (*Stegomyia*) *aegypti* Linnaeus.**

Mr. White lists this as "*Stegomyia fasciata* Fab." (page 68), although he recognizes by the synonymy that the name *fasciata* was preoccupied when proposed. This is presumably justified on the transference of Fabricius' name to *Stegomyia*; but this proceeding is not justified by the rules. He does not use the name *aegypti* Linn. because it appears to him that that name might equally well refer to *Aedes dorsalis* Meigen. Now, even if so, as a positive reference of the name has been made by me, this should hold; but it is evident from the description that *aegypti* cannot refer to *dorsalis*. Linnaeus mentions a shining transverse line behind the thorax and before the abdomen. Nothing on *dorsalis* represents this, but the silvery scales on the scutellum of the "yellow fever mosquito" correspond exactly, as when seen under a low power they present the appearance of a shining silvery transverse line. There does not appear to me to be the slightest doubt of the identification of *aegypti*.

***Cacomymia* Coquillett.**

Given (page 73) as a doubtful synonym of *Ochlerotatus*. The name is a synonym of *Haemagogus* (See Ins. Ins. Mens., ix, 101, 1921).

***Stegoconops* Lutz.**

Given (page 76) also as a doubtful synonym of *Ochlerotatus*. This is again *Haemagogus*, and it may be that Mr. White considers *Haemagogus* as doubtfully synonymous with *Ochlerotatus*. However, he does not give *Haemagogus* itself in the synonymy, which he should logically do if this supposition were correct.

Aëdes alpinus Linnaeus.

This is given (page 79) as *nigripes* Zett., the references to Linnaeus' earlier name having been overlooked (See Ins. Ins. Mens., viii, 53, 1920, and x, 73, 1922). Walker's names *impiger* and *implacabilis* are given as doubtful synonyms, but they represent two valid American species (See as to *impiger* Ins. Ins. Mens., viii, 8, 1920, and as to *implacabilis*, Ins. Ins. Mens., xii, 26, 1924).

Theobaldia Neveu-Lemaire (**Culiseta** Felt).

The subgeneric name *Allothcobaldia* Brolemann has been omitted (page 84). *Çulicella* Felt, another subgenus, appears wrongly in the synonymy of *Culex* (page 97). The name *Culiseta* is misspelled *Culiceta*.

Pneumaculëx Dyar.

This is given in the synonymy of *Culex* (page 99), and is credited to Theobald. It is in reality a synonym of *Orthopodomyia*, and is correctly entered in the monograph (Howard, Dyar & Knab, Mosq. No. & Cent. Am & W. I., iv, 877, 1917).

Thomasina Newstead & Carter.

Also erroneously given in the synonymy of *Culex* (page 99) and misspelled *Thomascina*. This genus is also a synonym of *Orthopodomyia*.

Runchomyia Theobald. **Binotia** Blanchard.

These names are given as synonyms of *Rachionotomyia* (page 113), although they antedate that name. In fact they have nothing to do with it, being synonyms of *Goeldia*, an American genus of predaceous Sabethids. *Rachionotomyia* does not occur in America, nor *Goeldia* in the Orient.

Wyeomyia, **Dendromyia** and **Phoniomyia** Theobald.

It is doubtful if any of the Oriental species actually belong to *Wyeomyia* or its subdivisions, except perhaps *nepenthicola* Banks of the Philippines. The species in the Indian catalogue are referable to *Heinzmannia* Ludlow (See Edwards, Ind. Journ. Trop. Med., x, 445, 1922).

The correct uses of American names, under the conceptions adopted in the catalogue, are not referred to in the preceding. Several of the synonyms of *Aedes* (as *Ochlerotatus*) and *Culex* are correctly given, though by no means all of the names that could have been quoted are given.

ON BRITISH COLUMBIAN MYCETOPHILIDAE—I (Diptera)

By C. B. D. GARRETT

In working up the fungus gnats of British Columbia I am particularly indebted to Mr. R. S. Sherman, who has spent much time on this family in the Coast Division from where he has described 20 or more new, and has sent me many species to work over, several of which I believe to be new. I am also greatly indebted to Col. C. H. Pollen, who has for many years done so much to help my studies in every way.

In the difficult genera *Beletina* and *Mycomya* it seems quite useless to describe one wing, owing to the variation shown in the series; but an average one is selected. The females seem hopeless at least as far as characters to connect them to their truthful mate. This has largely to be done by date and locality. Before me are several apparently not described, but except in a single case, I have refrained from describing, as I do not think the male may ever be properly connected with them.

The males have been studied chiefly by the hypopygium, and slides of nearly all species described are on hand. Most females have been considered as paratypes, and paratype males without the hypopygium mounted have been numbered.

Paratypes of some species will be found in the Canadian National Collection, the U. S. National Collection, and in that of R. S. Sherman. The remainder are in the author's collection.

***Mycomya terminata*, new species.**

Head grey-black; mouth parts and palpi yellow; antennae scape and base of flagellum I, yellow, the remainder black-brown; all segments twice as long as wide. Thorax, dorsum

grey-black; no vittae, but they are indicated by reflection, being slightly polished. Extreme humeral edge showing a brown shade. Bristles and hair dorsally black, laterally brown, with some black. Scutellum dark with two pairs of bristles. Propleura yellow brown, all others blackish, the pteropleura paler. Abdomen dark brown, with brown pilosity. Coxae yellow, the two hind darker, mid-coxal spurs weak, long and rather straight with the tip bent. Wing; C reaches the apex of the wing. Sc enters C proximad but nearly over mid cell R; Sc2 is proximad of the latter. Petiole of M shorter than M2; CU forks below cell R which is long trapezoidal, being over twice as long as deep. Hypopygium dark, some of the minor parts brown; tergite $\frac{1}{2}$; from near the center issue a pair of chitinized points (in *cranbrooki* and *caufieldi* called A); from near the lateral corner rises a large, fleshy, elongate oblong lobe, the inner tip of which has a rounded chitinized point directed inward (called B); from below this and near the middle of the lobe there is a chitinized point with a very long terminal bristle which sometimes branches near its middle. The sternite half near its center has a pair of triangular pyramids on the apex of which is a hinge, working a long chitinized projection, with an angle near its tip and two points at its apex (called C). (In pinned specimens C is usually completely folded in and not seen.) Between these and near the middle are a pair of thread-like chitinized prongs (called D). There are other lesser spikes from within the center.

Described from 8 males from Vancouver and Savary Island, B. C., in March and April. It is hard to limit the number of females by the variation; probably 5. The ♀♀ are as the ♂ but seem browner on the thorax. All specimens taken by R. S. Sherman.

***Mycomya cranbrooki*, new species.**

Male; similar to *terminata*, differing as follows: Palpi dark; all hairs and bristles of the dorsum brown; propleura black. The wing is between *terminata* and *caufieldi* in Sc1, Sc2; petiole of M about equal to M2; CU forks slightly proximad

of mid cell R. Hypopygium A is smaller. B is not distinctly chitinized and of slightly different shape, with the long terminal bristle shorter. C is parallel sided, its two apical points very small and short. D is differently shaped.

Holotype, Cranbrook, B. C., May 27 (C. B. Garrett).

***Mycomya caulfieldi*, new species.**

Similar to *terminata*, with the hypopygium different. The tergite half runs to a short central point, thus A is absent. The lateral flaps B are broad, not elongate. C is of different shape and ends in a single triangular point.

Holotype and allotype, Caulfields, B. C., May 5, 1917 (R. S. Sherman).

***Mycomya humidus*, new species.**

Male, occiput and front grey-black, face brown, mouth parts and palpi yellow. Scape and base of first flagellar joint yellow, the remainder dark brown, each segment about twice as long as wide. Thorax, dorsum obscure brown, primrose grey or all grey-black, no distinct vitta, but with a light brown patch behind the humeri. Propleura yellow, the remainder dark, brown-black. Abdomen, tergites dark brown with posterior margins yellowish. Venter sometimes pale. Coxae yellow, the hind one darker or infuscate, the spurs of the mid coxae are moderately long, and curved. Wing; C ends slightly beyond the apex of the wing; Sc enters C about over mid cell R; Sc2 is proximad of the middle of cell R which is trapezoidal, the shorter side being not much longer than the ends. Petiole of M slightly longer than M2. Cu forks below or more than the length of the RM cross vein proximad of it. Hypopygium yellowish, all pieces seem chitinized except the lateral flaps which may also be. Tergite half, dorsally in the center runs out into a long projection having a thin apex but a very broad base. The lower lateral corners run out into a long narrow oval flap pilose on the outer side. Sternite half with two cerci looking projections in the center which reach the arc made by the lateral flaps; to the side of these, but from within

a pair of sharp long spikes rise which also nearly reach the arc. There seem two other pairs of short spikes in the middle.

Described from 3 males and 3 females. Holotype and allotype, Wilson Creek, Michl, B. C., Sept. 24, 5,200 feet. Paratypes as holotype collected by C. B. Garrett and one male from Montana (Exp. Station, Yellowstone Park), 8,200 feet, Aug. 25, 1915.

Mycomya vulgaris, new species.

Male head grey black, mouth parts and palpi yellow. Antennal scape and base of first flagellar segment yellow, the remainder black except the first; each segment is hardly twice as long as wide. Thorax; dorsum grey black, opaque, the usual three vittae hardly visible, being a browner shade only. All bristles and hairs black. Scutellum black sometimes with a brown shade, set with two pairs of bristles and a few short hairs. Pleura black, propleura sometimes brownish, a rather large patch of yellow round the disk. Abdomen; tergites black, ventrals 2, 3, 4 yellowish occasionally, all with black pile. Halteres, coxae, femora and tibia yellow. Fore coxae anteriorly with a few scattered black hairs, a row of short bristles on the distal edge and a strong bristle about the middle of the proximad edge directed inward. Mid coxae with long curved spurs which hardly reach the base of the fore coxae below the head. Wing; C not produced past R₄, 5; Sc ends in C slightly distad of mid cell R; Sc₂ over the mid cell, which is trapezoidal, its short side about twice as long as the ends. Cross vein RM about equal to the basal sections of RS. The tip of R₄, 5 drops almost to the level of fork of M. Petiole of M shorter than M₂, M forks over the tip of CU₂; CU forks below or proximad of the RM cross vein. Hypopygium dark. Tergite half all chitinized large and appears like the top half of a sparrow's beak. This is composed of an inner and outer part. At the lower side of the tergite is a rather short cylindrical projection (about one-third the length of the beak) which terminates in three hairs. Sternite half in the middle has three pairs of triangular points from the center of the inside a soft bi-lobed pad rises yellowish and with pale pilosity.

The female is similar. The scape is not so yellow, it is darker. The flagellar segments are not twice as long as broad; the abdomen sometimes shows shadings of pale posterior edges brown yellow. The fore coxae has no inner bristle and mid coxae no spurs.

Described from 131 males and 55 females all from Fernie, B. C., July 21-29 (C. B. Garrett).

Mycomya magna, new species.

Male. The entire description of *vulgaris* applies to this species, except flagellum segments twice as long as broad. Both pairs of scutellum bristles are about equal in length. Abdominal ventrites 2 to 4 always brown yellow. Fore coxae with no inner lateral bristle, but a row of long hairs up that edge. Wing cell M often not twice as long as deep, leaving the tip of C over the distad end and Sc2 in the middle. CU forks more proximad. The hypopygium is somewhat similar to *vulgaris* but the beak has no inner piece, it being small, the cylindrical lateral projection is swollen oval club shaped and the entire apical half is set with fine pilosity. The points of the sternite half are slightly different, the whole together appearing quite different. It is larger than *vulgaris*. Female as the male, but the tergite often has a posterior yellow margin.

Described from 11 males, 13 females. Fernie, B. C., July 21-28

Mycomya ampla, new species.

Male. The description of *vulgaris* applies to this except the scape of the antennae is dark brown. The scutellum has one pair of bristles. The propleura is yellow. The tergites have a posterior yellow margin; all the abdominal hairs brown yellow. The fore coxae have no mid bristle. The mid coxal spurs are short, reaching only to three-quarters of its own coxae and they are almost straight. Hypopygium; tergite half along the middle edge with two pairs of thin flat oblong round tipped appendages. The lower lateral edge runs out into a long thin pale yellow fleshy lobe pilose on the outer side. The sternite half is cup shape, the top lateral edge running out and touching

at their tips, the bottom between being transparent skin. There are other minor spines within.

Female is as *vulgaris* but the scape more yellow. The abdomen with posterior yellow margins. The fore coxae more thickly pilose. Scutellum with one pair of bristles; and SC in one wing does not reach C.

Described from holotype, Hot Springs, Banff, Alberta, July 17, 1908 (N. B. Sanson), in the Canadian National Collection. Paratype, male and female, Fernie, B. C., July 9.

***Mycomya polleni*, new species.**

Male. Occiput and front grey black, face brown, mouth parts and palpi yellow; antennae, scape and all flagellar, one yellow, the remainder black brown. The basal segments are not, the apical segments are twice as long as broad. Thorax, brownish, three indistinct dark vittae somewhat greyish. Dorsum set with many rather long dark bristles. Scutellum black brown, paler below with two strong pairs of bristles. Pleura brown. Propleura and pteropleura yellow. Abdomen two basal segments sessile, compressed, the remainder depressed. All dark brown with posterior margins yellow. Vent sometimes pale. Coxae yellow, hind one with a large darker patch. Mid coxal spurs rather long and curved. Wing; C ends just beyond the apex of the wing. Sc joins C above the distal end of cell R. Sc2 is in the middle of the latter which is twice as long as deep. Petiole of M slightly shorter than M2; CU forks proximad of RM cross vein.

Hypopygium, tergite half dorsally has three triangular points, the lower lateral edge runs out into pale yellow fleshy oval flaps. Sternite half near the middle has a pair of longish triangular points, between which the usual pair of central blades show, which rise from within, on each side of these are a long and short chitinated spike which have a common base.

Described from 6 males, Cranbrook, B. C., July (C. Garrett). Named after the previously mentioned Col. C. H. Pollen.

***Mycomya difficilis*, new species.**

Color. Generally similar to *vulgaris*, but palpi dusky. Scape

base brown, next joint black, base of flagellar one for one quarter yellow, all the remainder black brown. Except flagellar one, the segments are just over twice as long as wide. Scutellum brownish, two pairs of bristles. Abdomen tergite with posterior yellow margins, hairs black. Coxae yellow, their bases all muddy yellow, fore coxae sparingly haired with relatively longish hair. Mid coxal spurs about three quarters as long as their coxae. Wing C ends beyond the apex of the wing. Sc enters C over mid cell R, Sc2 proximad of mid cell R which is twice as long as deep. Petiole of M equal or slightly longer than M2; CU forks proximad of the RM cross vein. Hypopygium, tergite half dorsally in the middle branches into two short points curved outward and their apex pilose. From near the lateral corners rise two oval or pear shaped flaps pilose on the outside. The sternite half, from the tip of the lateral corner makes a V hollow from the apex of the V (opposite the lateral corner) to the center of the sternite is a smaller V about half the length of the first (the whole appears like an M with an extra up line on each side). From within the usual mid pair of blades show between the central V and each side of the mid blades rise a pair of chitinized points with a common base. Centrally there is a soft fleshy pad. The female is similar but the flagellar segments are hardly twice as long as wide.

Described from 6 males and 1 female, Cranbrook, B. C., April and May (C. Garrett).

Mycomya shermani, new species.

Male. General color as *vulgaris*, face browner. Antennae; scape and most of flagellum one yellow brown, two or three brownish, the remainder darker. Segments twice as long as wide. Scutellum brownish with one pair of bristles. Propleura yellow brown and rest dark but brownish along the sutures. Abdomen dark with posterior yellow margins. All the ventral segments yellowish. Wing; Sc ends free, slightly beyond Sc2, Sc2 joins cell R very close to RS in one specimen, in the other Sc ends at Sc2 which angles forward and joins cell R

about its middle. The latter is not twice as long as deep, the end RS is almost equal to its next section. Petiole of M nearly equal to M₂; CU forks below the proximad end of the RM cross vein. Fore coxae on the inner half in front sparingly haired with long fine hairs. Mid coxal spurs fragile, long and slightly curved. Hypopygium; tergite half ends dorsally in a central point. Laterally the lower corner runs out to a medium long fleshy flap, pilose on the outer side. Sternite half, each side of the middle is a stem with a round point, from the inner side of the usual mid blades show and near the lateral corner are two triangular points with a common base, the whole being somewhat similar to Johannson's fig. 137 for *maxima*.

Described from two males, Michel, B. C., Sept. 1 (C. Garrett). Named after the previously mentioned R. S. Sherman.

NEARCTIC CALLIPHORIDAE, LUCILIINI¹

(Diptera)

By RAYMOND C. SHANNON

In the following treatment of the North American Luciliini, it is assumed that the three species determined by Hough and recognized subsequently as identical with the European species, *Lucilia caesar* Linné, *L. sylvarum* Meigen and *L. sericata* Meigen, are conspecific with the forms originally included under those names. The North American species herein recognized, *L. pilatei* Hough, *L. australis* Townsend, *L. unicolor* Townsend, *L. occidentalis* n. sp., *L. pallescens* n. sp. and *Francilia alaskensis* n. gen. and sp., are assumed to be distinct from previously described species.

This is done for the following reasons: (1) The collection at hand of Old World species, authentically determined, is insufficient to make correct identification by means of comparison; (2) the Old World species have not been sufficiently defined in many cases and this prevents accuracy of determina-

¹ The present study is based on the material in the National Collection. The writer wishes to thank Dr. Aldrich for his help and opinions on several matters.

tion from literature; (3) in a number of cases, the type specimens are no longer in existence. Under these conditions any attempt to make final decisions upon the status of our species would prove unsatisfactory. It is proposed instead to describe our species as definitely as possible, which may enable other workers, better situated, to check our species with those of the Old World; it is quite probable that others of our species will prove to be the same as those found in Europe besides the ones mentioned above, but meanwhile the names here used will be available for the North American forms.

In the table of genera of Calliphoridae² it is stated that the subcostal sclerite in the Luciliini and Calliphorini is without small black bristles. In the following study it was found that the subcostal sclerite has small black setae in *Lucilia caesar*, and this is apparently an infallible characteristic of this species.

L. caesar appears to be the only species in North America with the subcostal sclerite setose, but the following Old World species, as they stand determined in the National Collection, also possess this characteristic: *L. tasmanensis* Macq. (Australia); *L. ruficeps* Mg. (Europe); *L. nobilis* Mg. (Europe); *L. simulatrix* Pand. (Europe); *L. inducta* Wlk. (Asia); *L. fortunata* Wlk. (Philippines); *L. (Hemipyrellia) curriei* Tns. (Africa). Just how the application of this character would affect the status of these species, in regard to *L. caesar*, is a matter for the future.

Malloch has called attention³ to the fact that *Cryptolucilia* (*Orthellia Pseudopyrellia*), is closely related to *Lucilia*, the two genera possessing in common a peculiar character, namely, a tuft of hairs on a chitinized area (tympanic ridge, Lowne, Awati) which borders onto the attachment of the lower squama to the thorax. This tuft is here called the para-squamal tuft (see below discussion on the thoracic alar cavities). Also *Cryptolucilia* (all species?) has the subcostal sclerite setose as in *Lucilia*. *Pyrellia serena* Mg. (N. A.), has the subcostal sclerite setose, but these setae are absent in *Morellia micans*

¹ Ins. Ins. Mens., xi, 106, 1923.

² Ann. Mag. Nat. Hist., vol 12, 505.

Macq. (N. A.). In *Cryptolucilia* the hypopleural bristles are represented by a number of fine hairs which serve to distinguish it from *Lucilia*, and on the basis of this character the two genera are placed in different families. This character, the presence or absence of hypopleurals, is not, as Malloch states,⁴ always a sharply defined one and does not definitely separate Muscoidea in two distinct series the way they are now considered, as transitory stages can be found in a number of genera.

It may be well to mention an easily apparent biological condition in the Muscoid flies which seems to be correlated with the presence or absence of hypopleural bristles. The forms without hypopleurals (Scatophagidae, Anthomyidae and Muscidae) are in the larval stages, as a general rule, plant feeders or live in the excrement of herbivores; while those with hypopleurals (Calliphoridae; Sarcophagidae, Dexiidae, Tachinidae) are carrion feeders, or parasites, or live in the excrement of carnivores. A large number of exceptions can be pointed out but it is significant that most of these exceptions occur in the groups showing transitory stages of the hypopleural bristles. Thus, the Muscoid series of flies present an unbroken series of larval food habits, ranging gradually from one food substance to another probably in the following manner: beginning first with feeders in dead vegetable matter and leading, on the one hand, to feeders on living vegetable matter and, on the other hand, to (1) feeders on excrement of herbivores, (2) excrement of omnivores (e. g., man), (3) excrement of carnivores, (4) carrion, (5) parasites of vertebrates, (6) parasites of invertebrates, insects, mollusks, worms, etc. The Calliphoridae and Sarcophagidae in one species or another range through all of these habits except that (as far as known) of being feeders on living plant tissue. In a general way it can be stated that the forms without hypopleurals are plant feeders (living or dead plants) and those with hypopleurals are flesh feeders. In fact, it seems apparent that the presence or absence of the hypopleurals marks the "parting of the ways" in

⁴Ann. Mag. Nat. Hist., vol. 12, 1905

the Cyclorrhapha Myodaria, on the one hand leading toward the Acalypterae through the Muscidae, Anthomyidae and Scatophagidae, and on the other hand the "path" is along the Calliphoridae and Sarcophagidae toward the highly specialized Dexiidae and Tachinidae. The transitional forms, indefinite as to presence or absence of hypopleurals and larval habits, would mark the point at which the separation took place. The aberrant forms, in reference to larval habits, represent the "strayers" from their respective paths. One such "wayward" genus is *Gastrophilus*, a genus until recently placed in the Oestridae. It does not possess the hypopleural bristles and for this, and other reasons, the genus is now placed in the Anthomyidae. At first glance the parasitic (bot) habits of *Gastrophilus* appear to be a distinct exception to the plant (living and dead) habits of its congeners. However, as the species live in the alimentary tract of herbivores (Equidae) their parasitic habit may be an adaption readily obtained through a previous plant feeding habit.

The following remarks appertain to certain structural features to be found in what are here termed the *thoracic alar cavities*, particularly the posterior one. Both are rather shallow. The anterior one lies behind the prealar callus and immediately laterad and below the supra-alar ridge (i. e., the mesonotal ridge whereon the supra-alar bristles are placed) and is bounded behind by a sharp ridge, the *intra-alar ridge*. This ridge extends from the point where the anterior bristle of the post-alar callus is located clear to the wing base. The intra-alar ridge divides the anterior thoracic alar cavity from the posterior one. When the wings are folded the humeral part of the wing, the epaulet, basi-costa and the base of the first vein, i. e., stem vein, rest in the anterior cavity. The basal part of the stem vein rests immediately upon the intra-alar ridge.

The posterior alar cavity is bounded above (dorsad-mesad) by the ridge formed by the combination of the intra-alar ridge with the post-alar ridge. Behind, the cavity is enclosed by the vertical margin of the scutellum, while its lower margin is bounded by the anterior margin (i. e., the attachment) of the

lower squama. In this cavity, when the wings are folded, the alula of the wing and the upper squama are nested.

The posterior alar cavity itself is divided longitudinally into two more or less equal parts by a well defined suture. The upper vertical section is the post-alar declivity which is setose in the Calliphoridae and allies (Malloch). The lower section, or tympanic plate (Lowne,¹ Awati²) is more or less flat and triangular in outline, and is made up of two apparently different parts. The anterior part, tympanic membrane, immediately below the base of the wing, is hollowed out and within this pocket, tympanic pit, the species of *Lucilia* have a tuft of hairs. Within this pit, according to Lowne, is a "spiracle" which may have the function of an auditory organ. In *Francilia alaskensis* (new genus and species) the upper anterior margin of the pit is broadened and on this the hairs are placed instead of being down in the pit. This tuft of hairs is absent in *Cryptolucilia*. The posterior part or tympanic ridge appears as a cord-like prolongation of the lower corner of the scutellum extending between the squama and lower margin of the post-alar declivity. It has a more or less chitinated oval area bearing a patch of hairs (Malloch). This is here termed, for convenience, the *para-squamal tuft*. It was noted above that this tuft is present in *Cryptolucilia*. Awati has called attention to an analogous condition in certain Old World species of *Musca*.

In the descriptions below the abdominal tergites are numbered in the way they appear. The first tergite is almost entirely fused with the second so that the two appear as one, hence they are usually considered as the first tergite. Three other tergites are readily visible and are numbered 2, 3 and 4, respectively (morphologically they are the third, fourth and fifth). Where the shape of the head is given, e. g., "head broader than high," the view of the head is that of the frontal aspect.

The *basicosta* is readily apparent as a very distinct structure. It is a smooth, thin, scale-like structure and its lack of bristles

¹ Lowne, The Blow Fly.

² Awati, P. R., Indian Journ. Med. Res., 1917

make it readily distinguishable lying as it does between the bristly alar epaulet and the base of the costa which also bears strong bristles.

The *subcostal* sclerite is a small elongate triangular piece on the lower side of the wing extending from the basi-costa to the first vein.

The species of *Lucilia* in the Nearctic region have the following distribution: *caesar* and *sylvarum* are typically more northern forms (transitional and upper austral zones) and *sericata*, *australis* and *pallescent* are typically more southern (upper and lower austral zones); *pilatei* is neotropical and extends into the lower austral, while *elongata* and *F. alaskensis* are known only from Washington and Alaska respectively. *L. sericata* is also fairly abundant in the transitional zone.

L. sericata and *caesar* are well known as sheep maggots wherever extensive sheep raising is practiced. They have also been known to cause myiasis in man and animals but are commonly breeders in refuse and carrion. *L. sylvarum* is known to parasitize toads in Europe. Practically nothing is known of the immature stages of the other species.

LUCILIA, the green bottle flies

Generic characters: Metallic green or blue flies, rarely black, of robust appearance and approximating the size of *Musca domestica*; larger specimens may be two or three times the size of *M. domestica*. Front of male more or less narrowed, the fronto-orbitals and outer vertical bristles absent. Front of female of variable width, with inner and outer verticals and three fronto-orbitals, the uppermost one being in line with the "inner fronto-orbitals." Arista long, plumose. Bucca fairly well defined, with rather short beard. Mesonotal chaetotaxy: Presutural bristles: two acrostichals, three dorsocentrals, three sublaterals, three to four humerals, one posthumeral, one presutural, two notopleurals. Post sutural bristles: two to three acrostichals, three dorsocentrals, two intra-alars, three large supra-alars, two large and one small post-alars, ten marginal and two discal scutellars. Stem vein bare; subcostal sclerite

with or without black setae; first section of third vein bristly for one-half its length above and below. Para-squamal tuft present. With the exception of *unicolor*, *australis* and *oculata* the synonymy of Townsend's species stands as given by Tothill.

LUCILIINI

TABLE OF MALES

- A. Arista brevi-plumose, the dorsal bristles of first antennal joint being of equal length; two sublaterals (third sublateral absent); three intra-alars (new genus *Francilia*).....*alaskensis*, n. sp.
- AA. Arista of normal plumosity; three sublaterals; two intra-alars (first one absent).
- B. Basicosta black.
 - C. Palpi yellow; two post acrostichals, subcostal sclerite with black setae*caesar* Linné
 - CC. Palpi dark brown to blackish; three post acrostichals; subcostal sclerite without setae.....*sylvarum* Meigen
- BB. Basicosta yellow.
 - C. Two post acrostichals.
 - D. Beard black; parafrontals very narrow, contiguous; second tergite with post margin concolorous with rest of segment.....*australis* Towns. and *unicolor* Townsend
 - DD. Beard mostly yellow; parafrontals separated by width of a parafrontal; second tergite with post margin bluish black.....*pilati* Hough
 - CC. Three post acrostichals.
 - D. Hypopygium conspicuous; lobes of fifth sternite prominent, ligulate, with dense long hairs...*pallenscens*, n. sp.
 - DD. Hypopygium nearly concealed, lobes of fifth sternite inconspicuous, appressed, with shorter, stiffer hairs, *sericata* Meigen

TABLE OF FEMALES

- A. Basicosta black.
 - B. Three post acrostichals; palpi dark brown to black, *sylvarum* Meigen
- BB. Two post acrostichals; palpi yellow (*caesar*), or brownish (*elongata*).
 - C. Subcostal sclerite with small black setae; post margin of second tergite with weak appressed bristles...*caesar* Linné
 - CC. Subcostal sclerite without setae; post margin of second tergite with strong erect bristles.....*elongata*, n. sp.

AA. Basicosta yellow.

B. Two post acrostichals; front above antennae no broader than length of third antennal joint.

C. Beard black; facialia setae arranged in a single row,
australis Towns. and *unicolor* Towns.

CC. Beard mostly yellowish; facialia setae arranged in several irregular rows.....*pilatei* Hough.

BB. Three post acrostichals; front above antennae much broader than length of third joint.

C. Parafacial broader than parafrontal.....*sericata* Meigen.

CC. Parafacial as broad as parafrontal.....*pallesceus*, n. sp.

Francilia, new genus.

Belonging to the tribe Luciliini but possessing the following distinguishing characters. Arista somewhat thickened on basal half, short-plumose, the upper rays being distinctly shorter than width of third antennal joint taken through the thickest axis. Face produced forward on oral axis. Two sublaterals, the posterior one absent. Three intra-alars, the anterior one being additional. Anterior tuft of hairs in post-alar cavity placed on upper margin of the pit (tympanic membrane) in which they are found in *Lucilia*.

Francilia alaskensis, new species.

Small species, deep metallic green with violet reflections.

Male.—Head somewhat higher than broad. Front and face black, overlaid with silvery pruinescence. Front narrowed, its width at narrowest point slightly less than distance between oral vibrissae. Frontal vitta slightly broader than parafrontal. Parafrontal about one-half width of parafacial. Antennae black; arista longer than third joint. Beard black. Palpi yellow with scattered setae. Legs black. Wings slightly darkened; squamae white. Costal spines at tip of auxiliary vein easily apparent. Post-margin of second tergite with long appressed bristles, extending nearly across third tergite. Hypopygium ventral in position, prominent; lobes of fifth sternite well developed, rather broadly ligulate with rather sparse black hairs.

Two male specimens: Old Crow, Alaska, June 18–20, 1912 (J. M. Jessup).

Type.—Cat. No. 26690, U. S. N. M.

***Lucilia caesar* Linné.**

Robust species averaging 8–10 mm.; bright green to dark blue in color.

Head: In male nearly as high as broad; front and face black with silvery reflection; front much narrowed, parafrontal about one-third the width of parafacial, the two nearly contiguous a short distance below ocelli.

In the female the head is broader than high; front a little longer than broad; frontal vitta about three times the width of a parafrontal; parafrontal nearly as broad as parafacial.

Antenna black; arista about equal in length to antenna, long plumose; facialia with setae extending one-half the length; beard black; palpi yellow with scattered black setae. Two post acrostichals, otherwise chaetotaxy of mesonotum as given for genus. Wings: Basicosta black; subcostal sclerite bearing small black setae. Wing bases and squamae sometimes darkened. Costal spines barely distinguishable. Legs black. Abdomen shining, without pollen; first segment sometimes blackish. Forceps of male curved forward; outer forceps fairly slender, tapering toward point but with the points enlarged; inner ones more slender than outer, sharply pointed. Pile on forceps sparse and rather short, longer on inner surface. Lobes of fifth sternite rather large, broadened basally, rounded apically and bearing numerous black hairs.

Specimens at hand are from Canada, New England, New York, Pennsylvania, Maryland, Virginia, Ohio, Indiana, Michigan, Colorado, South Dakota, Idaho, Washington, Alaska, and one specimen Beulah, New Mexico.

***Lucilia sylvarum* Meigen.**

Usually dark green to blue in color, averaging 7–9 mm. Head in male nearly circular in outline; face and front black overlaid with silvery pruinescence; front at narrowest width about equal to width of parafacial; frontal vitta greatly narrowed, about equal in width to a parafrontal; facialia with several irregular rows of setae extending one-third its length.

Female with head broader than high; front longer than

broad; frontal vitta about twice as long as broad; parafrontal less than one-half width of frontal vitta and but little less than width of a parafacial.

Antennae black; arista longer than antenna; third antennal joint shorter than width of front; beard black; palpi dark brown to black. Three post acrostichals. Costal spines easily apparent. Basicosta black; subcostal sclerite black, without setae; wing bases darkened; squamae white, sometimes tinged blackish. Lower squama somewhat triangular, the posterior margin as broad as the length of the squama. Legs black. First tergite bluish black; remainder shining green or blue, without silvery pollen. Post margin of second tergite sometimes with medium pair of prominent bristles, particularly in the male, which sometimes has an extra pair, closer together and in front of them.

Hypopygium nearly concealed; lobes of fifth sternite normal, appressed, with long hairs; outer forceps tapering gradually to the long point which is about one-third the length of forcep and is directed slightly backward; inner forceps tapering gradually to tip, straight; pile on forceps rather short and sparse.

This European species is fairly well confined to our transitional zone. The collection contains specimens from Canada, Maine, New York, Pennsylvania, Maryland, Virginia, Indiana, Colorado, Nebraska, South Dakota, Idaho and Washington.

In Europe it has been reported as being parasitic on toads.

***Lucilia elongata*, new species.**

Female.—Differs in habitus from other species of this genus by its elongate appearance. Probably allied closest to *sylvarum*. Differs from this species as follows: Bristles everywhere more strongly developed, as well as the beard which is bristle-like. Front noticeably broader than length of third antennal joint (in *sylvarum* the third joint is somewhat shorter than width of front); arista about one-fifth longer than length of antenna. Palpi yellowish brown. Two post acrostichals. Wings tinged brownish basally; squamae white; lower squama smaller and less broadened posteriorly. Costal spines easily apparent.

Alula as broad as long (much longer than broad in *sylvarum*); anterior crossvein placed a little before middle of discal cell (placed beyond middle in *sylvarum*). Post margin of second tergite with a dorsal row (18) of strong bristles.

Length 9 mm.; wing 8 mm.

One female: Mt. Constitution, Orcas Island, Washington, July 7, 1905, J. M. Aldrich.

Type.—Cat. No. 26688, U. S. N. M.

Lucilia sericata Meigen.

This species has a rather uniform shade of green, with a faint silvery pruinescence on the abdomen; robust species averaging 8–10 mm. Front and face with more or less a yellowish shade, overlaid with silvery pruinescence. In male the head is broader than high; front distinctly narrowed but much less so than in *caesar*; frontal vitta at narrowest width a little more narrow than width of parafacial; parafrontal less than one-half the width of parafacial.

Head in female noticeably broader than high; front as broad as long, sometimes broader, gradually widening downward; frontal vitta more than twice the width of a parafrontal; parafrontal distinctly narrower than parafacial. Antennae black, arista a little longer than antenna, long plumose; third antennal joint much shorter than width of front. Distance between facialia about equal to width of frontal vitta. Beard black. Palpi yellow with scattered black setae. Brightness of mesonotum slightly obscured by silvery pruinescence; three post acrostichals, otherwise chaetotaxy as given for genus. Costal spines barely distinguishable. Basicosta light yellow; subcostal sclerite yellow, without setae; squamae white. Legs black. First tergite darker than remaining ones; rest of abdomen with coppery to greenish reflections, obscured somewhat by silvery pruinescence. Hypopygium nearly concealed; lobes of fifth sternite small, broader than long, appressed, with black setae. Outer forceps with inner surfaces facing each other, rather broad, thin, sparsely pilose; inner forceps straight, pointed, with short, loose pile.

Specimens of *L. sericata* have been seen from Canada and practically from every State in the United States, more common in Southern States.

***Lucilia pallescens*, new species.**

Small species characterized by a very perceptible silvery pollen on thorax and abdomen giving a somewhat grayish tinge to the green metallic ground color.

Male.—Head broadly oval in outline, the face but little protruding downward; front and face black, but densely overlaid with silvery pollen, except on frontal vitta, giving a silvery aspect to head. Front rather broad, its narrowest width is nearly as broad as length of third antennal joint. Antennae rather small; arista slightly longer than antenna. Parafacial broader than frontal vitta. Facialia with only a few setae on lower portion. Wings slightly darkened; basicosta light yellow; squamae white. Hypopygium conspicuous (as in *Sarcophagidae*); lobes of fifth sternite long, ligulate, with dense long hairs. Outer forceps straight, pointed; inner ones straight, slender and pointed.

Female.—Head much broader than high; width of front nearly twice the length of third antennal joint; frontal vitta nearly twice width of parafrontal; parafacial and parafrontal of nearly equal width.

Length 7.5–8 mm.; wing 7 mm.

Male type and female allotype, Wilmington, North Carolina, July 1, 1919. Caught in fly trap, Max Kisliuk. Thirty specimens.

Type.—Cat. No. 26689, U. S. N. M.

***Lucilia unicolor* Townsend.¹**

Of the five specimens mentioned by Townsend when describing *Lucilia unicolor* only one specimen can be found in the collection. This bears the type label, and is evidently the one recorded as the type since it bears the locality which Townsend gives for the type specimen, Mesilla, New Mexico.

¹ *Muscoid Flies*, 119, 1908

It is very similar to the specimens Townsend described as *australis* and *oculata*, but as it differs somewhat from *australis* it should, at least for the present, be considered as a separate form. If it subsequently proves to be the same species its name would have priority over *australis* as it appears first in the publication. It differs from *australis* mainly in having the head higher in proportion to its breadth; the front is broader in proportion to the height and the antennae are very dark brown.

A male specimen in the collection (Rio Aravaipa, Arizona, 2,500 feet) which may be referable to the female has the inner hooks suddenly curved forward at their apices. The front of this male is noticeably broader than typical *australis* males.

Lucilia australis Townsend.

Synonym: *L. oculata* Townsend.

A large robust species, shining green or blue, showing practically no trace of silvery pruinescence, except on head and pleurae.

Description based on type specimen, a female. Head in frontal aspect distinctly broader than high, gently curved above, face somewhat protruding below. Front black, the parafrontals overlaid with silvery pollen; face with brownish tinge, overlaid with silvery pollen. Front much longer than broad the third antennal joint longer than width of front; frontal vitta twice the width of parafrontal; parafrontal but little narrower than parafacial. Antennae brownish; arista as long as antenna with long and dense plumosity. Facialia with single row of setae extending upward one-half its length. Palpi yellow, with scattered setae. Two post acrostichals. Legs black. Wings slightly darkened basally; basicosta yellow, brownish on mesal margin; squama white, lower one subtriangular.

Male.—The parafrontals contiguous a short distance below ocelli, and the parafrontals are much narrowed, so that the front at its narrowest width is less than the width of a parafacial. Post margin of second tergite with fairly strong bristles.

Hypopygium ventral, inconspicuous. Outer forceps a little curved forward, apex rounded; inner forceps slender, straight. Pile on forceps rather dense.

Length 9–11 mm.; wing 8 mm.

This is a common woodland species within its range. Specimens in the collection are from Maryland, Virginia, North Carolina, South Carolina, Indiana, Kentucky, Tennessee, Georgia, Florida, Alabama, Mississippi and Texas. This species was placed as a synonym of *caesar*. I am indebted to Dr. Aldrich for calling my attention to the fact that it is a distinct species.

***Lucilia pilatei* Hough.**

A bright green species with post margin of second tergite dark blue, without much trace of silvery pollenosity; size variable. Description based on part of the original type material.

Malc.—Head a little broader than high, gently curved above, face somewhat protruding downward. Front black, parafrontals overlaid with silvery pollen; frontal vitta much narrowed, the parafrontals nearly contiguous; parafrontal narrower than parafacial; narrowest width of front greater than a parafacial. Antennae a little less than average size, pale brown; arista slightly shorter than antennae. Face, except upper parafacial and bucca, yellowish; several irregular rows of setae extending half way up facialia. Bucca darkened, with black beard on anterior part and pale beard on posterior three-fourths. Palpi yellow; with scattered setae. Wings slightly darkened; basi-costal yellow; squamae nearly white. Legs black. First tergite bluish black; post margin of second tergite bluish black. Outer forceps thin, lamellate; inner ones slender, pointed. Pile on forceps sparse and short.

Front of female distinctly more narrowed than in *sericata*, somewhat broader than in *australis*; the width about equal to length of third antennal joint. Frontal vitta about twice width of parafrontal; parafrontal but little more narrowed than parafacial.

Length 8–10 mm.; wing 7–8 mm. Represented by specimens

from Virginia (Virginia Beach), North Carolina (Wilmington), Georgia (Tifton), Florida (Miami), Mississippi (Pass Christian), Porto Rico (Fajardo).

UNDESCRIBED SPECIES OF NEMATOCEROUS DIPTERA FROM NORTH AMERICA AND JAPAN

By CHARLES P ALEXANDER

The types of the new species described at this time are preserved in the writer's collection, except where stated to the contrary.

Family ANISOPODIDAE

Subfamily TRICHOCERINAE

Trichocera bituberculata, new species.

Male.—Length 4.5 mm.; wing 5.7. mm.

Rostrum and palpi black. Antennae brownish black throughout. Head black, gray pruinose.

Mesonotum and pleura black, sparsely pruinose. Halteres brown, the base of the stem very faintly brightened. Legs with the coxae and trochanters brown, the fore coxae darker brown at bases; remainder of legs dark brown. Wings with a pale brown tinge, the stigma slightly darker brown; veins dark brown. Venation: Sc_1 ending opposite the fork of R_{2+3} , Sc_2 opposite three-fifths the length of Rs ; R_{2+3} a little less than twice the basal section of R_2 ; basal deflection of Cu_1 a little less than its own length from the outer end of cell 1st M_2 ; m fully twice the outer deflection of M_3 .

Abdomen dark brown, including the hypopygium. Male hypopygium with the dististyles elongate, with two small setigerous tubercles on mesal face, one, a little larger and stouter, at the base, the second at about one-fourth the length of the style; mesal face of style beyond these tubercles with short but not conspicuous dense trichiae. Lateral angles of the phallosome produced caudad and laterad into long, slender spines.

Habitat.—Alaska.

Holotype, ♀, Bethel, September 25, 1917 (A. H. Twitchell).

Type returned to the collection of the United States Biological Survey.

***Paracladura nipponensis*, new species.**

Female.—Length 3 mm.; wing 4 mm.

Rostrum light yellowish brown, the palpi brownish black. Antennae with the scapal segments obscure yellow, the flagellum dark brown, with dark trichiae. Head grayish brown.

Mesonotum brown, the praescutum with two intermediate darker brown stripes that attain the suture; scutellum more testaceous. Pleura darker brown. Halteres pale yellow, the extreme bases even brighter, the knobs dark brown. Legs with the coxae testaceous, the fore coxae infuscated basally; trochanters yellowish testaceous; femora brownish testaceous, the remainder of the legs passing into brown. Wings tinged with pale brown, the stigmal region vaguely darker; veins dark brown. Venation: Sc_1 ending opposite r , Sc_2 opposite two-fifths the length of Rs ; R_{2+3} equal to the basal section of R_2 ; petiole of cell M_1 a little more than one-half the cell; $m-cu$ equal to m , cell Cu_1 being correspondingly short and broad.

Abdomen dark brown, the caudal margins of the segments narrowly paler, broader on the sternites. Ovipositor with the valves broad basally, the tips narrowed, infuscated.

Habitat.—Japan (Kiushiu).

Holotype, ♀, Mt. Kirishima, on boundary between Osumi and Hiuga, altitude 3,250 feet, October 30, 1923 (T. Esaki).

Family CECIDOMYIIDAE

Subfamily LESTREMIINAE

***Catocha subobsoleta*, new species.**

Male—Length 4.8 mm.; wing 6.4 mm.

Most closely related to *C. americana* Felt, from which it differs as follows:

Size larger. Antennae 16-segmented, the basal enlargements of the fourth to sixth segments broad, fully one-half as broad

as long, on the succeeding segments becoming more elongate; the apical enlargements of the flagellar segments are indicated but are small and setiferous on the outer face. The unique type is badly discolored. Mesonotum gibbous, reddish brown with two darker brown stripes, the humeral region brightened. Mesopleura with the suture between the anepisternum and sternopleurite complete. Coxae elongate, especially the fore coxae. Wings with *Sc* entire, ending in *C* a short distance beyond *r-m*; *M* faint but preserved for its entire length, bending strongly toward *Rs* so *r-m* is greatly reduced; vein 2nd *A* becoming entirely obsolete beyond midlength.

Habitat.—United States (Washington).

Holotype, ♂, Longmire Springs, Mt. Rainier, June, 1917 (H. G. Dyar).

Type in the collection of the United States National Museum.

This interesting gall-midge is distinguished from *C. americana* by its larger size and the venational details, especially the shortened *r-m* and the obsolete apex of vein 2nd *A*.

***Catocha nipponensis*, new species.**

Male.—Length 5.5 mm.; wing 8.1 mm.; antenna 7.2 mm.

Antennae dark brown throughout, the elongate basal flagellar segment with the slightly enlarged basal portion more than four times the glabrous apical pedicel; succeeding flagellar segments with the base slightly enlarged, this longer than the shiny apical pedicel, the latter feebly dilated at the distal end, but scarcely nodose. Head dark gray.

Mesonotum more flattened dorsally than *C. subobsoleta*; suture between the anepisternum and stenopleurite indicated caudally but the cephalic portion obsolete. Thorax dark brown, sparsely pruinose, the praescutum with three blackish stripes. Halteres pale brown, the base of the stem brighter. Legs with the elongate coxae pale, a little darker basally; femora brown; tibiae and tarsi brownish black. Wings subhyaline, the veins dark brown. Venation: *r-m* elongate but oblique; *M* strongly preserved throughout its length, with macrotrichiae; cell *M*₂ about two-thirds its petiole; vein 2nd *A* preserved throughout its length.

Abdomen black, the genitalia paler, brown; dististyles black, covered with short hairs.

Habitat.—Japan (Honshiu).

Holotype, ♂, Mt. Minomo, Settsu-no-kuni, November 15, 1923 (C. Teranishi).

Dr. Crampton, who has studied the thoracic morphology of the above two species of *Catocha*, considers that the differences shown in the shape of the thorax and the individual pleural sclerites are sufficient to warrant the erection of a new generic group for one of them.

A NEW MOSQUITO FROM TEXAS

(*Diptera, Culicidae*)

By R. L. TURNER

Aedes alleni, new species.

Somewhat similar to *Stegomyia aegypti*, but with marked differences in the thorax, tarsi, etc., the thorax being apparently entirely silvered (so in front, denuded behind), the tarsi with smaller white rings; size larger. The larvae were taken from a willow tree-hole on December 28, 1923, at Mission, Texas. They were nursed through January, pupated the 22d and emerged the 30th, 1924. The thorax of the larvae seemed swollen as compared with *Stegomyia*, otherwise similar.

Named for Mr. A. F. Allen, Sanitary Engineer.

NOTE.—Mr. Turner has sent the two males bred to the National Museum. The species is a *Finlaya*, abundantly distinct. The side piece is without hair-tuft at the middle, the claspette with small subapical seta. This would throw it into the *terrans* group, but the coloration of the adult negatives this (See *Ins. Ins. Mens.*, vi, 80, 1918). Near *triseriatus* Say, but with ringed tarsi and more silvery on the mesonotum.

HARRISON G. DYAR.

NOTE ON CULEX FLAVIPES MACQUART

(Diptera, Culicidae)

By C. BONNE

Through the kindness of Mons. Séguy, I had an opportunity to examine the type of this species in the Museum of the Jardin des Plantes at Paris. The legs have practically disappeared, body and wings are both badly denuded. One thing is very obvious, however, the abdomen ends in a sharp point, and it does not resemble at all *Culex quinquefasciatus* Say, with which it has been identified. In size and general appearance it looks like an *Aedes* or small *Psorophora*, something like *Aedes nubilus* Theobald. The type is from Concepcion, Chile, South America.

NOTES ON SABETHIDS FROM PANAMA

(Diptera, Culicidae)

By HARRISON G. DYAR AND RAYMOND C. SHANNON

Wyeomyia (Heliconiamyia) chalccephala Dyar & Knab.

The junior author obtained this species in the flower-bracts of a *Heliconia* at Close's Plantation, Cano Saddle, Canal Zone, in May, 1923. This is the first record of this species in Panama.

The larva is very distinct. Mouth-brushes rather short, stout and dense. Antennae equalling the brushes, slender, uniform, smooth; a single hair at apical fourth. Frontal spines stout and long. Clypeal hairs on the lower part of face forming a curved row of three on each side, outer in three, middle in two, inner in five. Thoracic hairs in strong multiple tufts, the meta-thoracic lateral arising from a large infuscated tubercle. Lateral abdominal hairs in threes after the second segment. Comb of the eighth segment of many spines in a patch (about 40), the single spine blunt-ended and slightly fimbriate. Air-tube conical, about three times as long as wide; a pair of 3- to 4-haired tufts near the base posteriorly, followed by a delicate fringe in about four irregular rows; anteriorly with scattered 2- to

3-haired tufts in a double irregular row the length of the tube. Anal plate with the dorsal angles approximate, each bearing a long 3-haired and 2-haired tuft; lateral angles produced, with a single long hair; two short stout 5-haired tufts subventrally. Anal gills four, long and sack-shaped.

The figure in the monograph (Plate 92, fig. 296) is inaccurate, having been drawn from an imperfect specimen.

Wyeomyia (Decamyia) pseudopecten Dyar & Knab.

The junior author bred this species from the same species of *Heliconia* as produced *chalcocephala*, although a different individual plant (*onidus* being associated in smaller proportion), and it becomes evident to us what is the identity of *galoa*, bred in Guatemala by H. S. Barber together with *chalcocephala*. *Galoa* is a synonym of *pseudopecten*. The bluish lobes and whitish hind feet, together with the pale band on the occiput, check up exactly. See notes by the senior author on *galoa* (Ins. Ins. Mens., xi, 65, 1923) and on *pseudopecten* (Ins. Ins. Mens., xi, 170, 1923), to the synonymy of which *galoa* may now be added.

A peculiar occurrence of the larvae of *pseudopecten* was noted, namely, in the flower-sheath of a palm, lying on the ground and filled by rain-water, at Cano Saddle, C. Z., August 11, 1923. Associated with the *pseudopecten* were other species of more normal occurrence in such a situation, namely, *Wyeomyia* (*Triamyia*) *apronoma* D. & K., *Wyeomyia* (*Limatus*) *paraensis* Theob., *Culex* (*Carrollia*) *secunda* B.-W. & B., *Culex mollis* D. & K., *Lutzia allostigma* H., D. & K., *Megarhinus hypoptes* Knab and *Haemagogus* sp. ♀ (probably *lucifer* H., D. & K.)

Wyeomyia (Dinomyia) phroso Howard, Dyar & Knab.

The junior author cut down a large "cow's tongue" *Heliconia* growing on Erwin Island (Barro Colorado Island), C. Z., and hollowed out the stump which he filled with water. A large colony of the larvae of *Culex declarator* rewarded his efforts, after which the stump was neglected. Later, on a visit by both of the writers, the receptacle was found naturally filled,

partly by the juice of the plant and partly by rain. The receptacle now held Sabethids, *Phoniomyia chrysomus*, *Hystatomyia circumcincta* and *Dinomyia phroso*. The latter had never before been bred, and even now we are not certain of its natural habitat. *Chrysomus* and *circumcincta* inhabit *Tillandsia*, but *phroso* has never been bred from this plant.

However, the very interesting larva was secured. Head round, frontal spines long and stout; clypeal hairs low down toward the front margin, all four single, a four-haired tuft above opposite base of antenna. Antenna exceeding the mouth brushes, uniform, smooth, a single hair towards the tip. Thoracic hairs moderately stout; lateral abdominal hairs in twos after the second segment. Lateral comb of the eighth segment of many scales in a patch (about 30), the single scale broadly blunt-tipped and minutely fimbriate. Air-tube tapered, about two-and-a-half times as long as wide; a posterior band of fine fringe-hairs about four rows wide, from near base to near apex of tube; on the anterior aspect is a single hair, and three more close to the tip. Anal segment half encircled by the dorsal plate, the upper angles somewhat produced, approximate, bearing a long tuft of four and one of two hairs below it; at the lateral angle of the plate a long two-haired tuft; subventral tufts in fives, rather long. Anal gills four, large and bladder-like, equal.

Sabethinus undosus Coquillett.

The junior author collected larvae of the species at Porto Bello, Panama, in water in bamboo stems. In the monograph (Vol. iii, page 35) some doubt is cast upon the predaceous habits of these larvae. The senior author, therefore, observed this culture with care, and was able to see the use of the long maxillae. The larva observed was lying in the bottom of the breeding-jar among the sediment, and thrust out leisurely first one long maxilla and then the other, gathering into its mouth chunks of the sediment. No predaceous behavior was observed, and it seems probable that in the original observation of Mr. Busck some species of *Goeldia* was involved, the larvae not at the time distinguished from the similar larvae of *Sabethinus*.

Wyeomyia (Hystatomyia) coenonus Howard, Dyar & Knab.

The senior author collected larvae from yellow *Calathea* flowers (*Calathea insignis* Peters) at Gatun, Canal Zone, from which female *Hystatomyia* adults appeared, which we presume to belong to this species. The larvae are so similar to those of *circumcincta* (See Monograph, Plate 92, fig. 298) that we fail to note any points of difference. The head hairs seem to run across in more nearly straight and parallel lines, but this may be due to the position of the skin.

Wyeomyia (Wyeomyia) scotinomus Dyar & Knab.

We have made every effort to distinguish this species from *leucopisthepus*, but seem forced to the conclusion that they are the same. The synonymy has been given by the senior author (Ins. Ins. Mens., xi, 173, 1923). The name *scotinomus* has precedence.

The larvae occur in the large smooth-leaved *Tillandsia* and also in the spiny-leaved Bromeliaceae, kindly determined for us by Mr. Paul C. Standley as *Aechmea setigera* Mart. In the male hypopygium, the "core arm" may be free or bent over to cross the disk, in which case the end seems pectinate or even digitate. This latter condition was supposed to be characteristic of *scotinomus*, and we bred specimens from *Aechmea* which were similar, though less marked. However, another *Aechmea* specimen showed the typical free "core-arm" of *leucopisthepus*. The old material in the collection is not differentiated as to its origin as between these two plants, though specimens occur both with the arm free and folded over. We are reluctantly forced to the conclusion that there is but one species represented, the difference in appearance being due to the position in which the "core-arm" happens to lie. No larval differences are noted between the *Aechmea* and the *Tillandsia* specimens.

A final consideration seems to clinch the matter, which is that *Phoniomyia chrysomus* and *Hystatomyia circumcincta* occur both in the *Aechmea* and *Tillandsia*, and also in cultivated pineapple, showing that there is no essential difference between

these plants that would warrant the occurrence of a different fauna

Wyeomyia (Wyeomyia) homothe Dyar & Knab.

The junior author collected larvae in a wild pineapple at Close's Plantation, Cano Saddle, Canal Zone, August 6, 1923, which were brought back to the laboratory and bred out by us. *Wyeomyia homothe* emerged, though unfortunately without male, and also *Goeldia longipes* Fab. From an examination of the preserved skins, it is evident that *Phoniomyia chrysomus* was also present. It is thought that *Wyeomyia rolonca* D. & K. may be the male of *homothe* (Dyar, Ins. Ins. Mens., xi, 173, 1923), but this we were unable to confirm. In regard to previous records of occurrence, A. H. Jennings bred a specimen from a Bromeliad on a fallen tree; but one bred by L. H. Dunn is marked "tree hole." *Rolonca* was bred from *Tillandsia*. The species probably breeds in various Bromeliads, in the manner of *chrysomus* and *scotinomus*, although it is no longer met with in the sanitated parts of the Canal Zone.

The larva is very similar to that of *scotinomus* (*leucopisthepus*). Two skins are before us, both in distorted condition, so that it is difficult to make out the arrangement of the teeth of the comb of the eighth segment. These appear to be arranged in two slightly separated patches with one or two teeth considerably detached instead of the long uniform line of *scotinomus*.

The following table will separate the known larvae of the Sabethids of Panama:

Comb of the 8th segment of scales.

Maxilla with sharp single terminal horn and side teeth.

Comb of 20 spines "from membranous integument;" tube with single long hair and weak posterior fringe (Gordon & Evans).....(*Sabethoides*) **chloropterus** Humboldt

Comb of 9-16 spines "on a strip of chitin;" tube two and a half times as long as wide, a few small hairs; terminal hooks large (Bonne).....(*Sabethes*) **bipartipes** Dyar & Knab

Comb of about six spines, free; tube with single long hair near middle, other setae short (*Sabethinus*)

Tube long and slender; no hooks on seventh segment,
undosus Coquillett

Tube short; a pair of hooks on seventh segment,
aurescens Theobald

Maxilla not so formed.

Maxillae hairy; tube with no or weak posterior fringe.

Eighth segment without a plate.

Air-tube with false pecten.

Tube long and slender; six long false pecten
 teeth (*Hystatomyia*),

circumcincta Dyar & Knab,

coenonus Howard, Dyar & Knab

Tube moderate; two to four short false pecten
 teeth (*Decamyia*).

Comb scale broad spatulate,

onidus Dyar & Knab

Comb scale narrower, spatulate,

eloisa Howard, Dyar & Knab

Comb scale narrow linear,

pseudopecten Dyar & Knab.

Air-tube without false pecten.

Tube without posterior fringe.

Comb scales a patch; tube with basal ring
 (*Triamyia*)... **aporonoma** Dyar & Knab

Comb-scales few; tube short with double tufts.

Subventral anal tufts in 3 or 4, long (*Le-*
matus)... **durhami** Theobald¹

Subventral tuft multiple, in 10, short
 (*Lemmamyia*)... **asullepta** Theobald²

Comb-scales numerous, in a single line (*Wyeu-*
myia).

Hairs on tube mostly single.

Air tube moderate; hairs all single.

Comb-scales in a long even line,

scotinomus Dyar & Knab

Comb-scales in a broken line,

homotha Dyar & Knab

Air-tube longer; basal hairs double,

chrysomus Dyar & Knab

Hairs on tube all neatly double,

simmsi Dyar & Knab

¹ *Paraensis* Theobald is the same.

² *Pseudomethysticus* Bonne Webster & Bonne, not bred, but presumably the same.

Tube with weak posterior fringe.

Comb scales 8 or 9 (*Calladimyia*),

melanocephala Dyar & Knab

Comb-scales a patch.

Tube with weak scattered posterior fringe
to base (*Dinomyia*),

phroso Howard, Dyar & Knab

Tube with stout 2-3-haired tuft near base;
scattered fringe following it (*Helico-*
niamyia)..**chalcocephala** Dyar and Knab

Eighth segment with chitinous plate.

Plate of eighth segment before the scales (*Pente-*
myia).....**bromeliarum** Dyar & Knab

Scales of eighth segment on the plate (*Miamyia*).

Tube moderate; comb with 6 scales,

codiocampa Dyar & Knab

Tube long; comb with 5 scales,

hosautus Dyar & Knab

Maxillae with terminal short horn and appendage; tube with
posterior fringe; hairs obsolete (*Goeldia*).

Comb of 30 teeth on a long bar; fringe single,

homotina Dyar & Knab

Comb of separate scales in a patch; fringe tufted,

longipes Fabricius

Comb of eighth segment absent, a seta on a tubercle (*Joblotia*).

Maxillae concealed.....**digitatus** Rondani

Maxillae projecting**trichorries** Dyar & Knab³

The following Panama Sabethids are not yet known in the
larval state:

Sabethes cyaneus Fabricius.

Sabethes tarsopus Dyar & Knab.

Wyeomyia (?*Shropshirea*) *agnostips* Dyar & Knab. ?Tree hole.

Wyeomyia (*Dodecamyia*) *clazoleuca* Dyar & Knab.

Wyeomyia (*Hystatomyia*) *intonca* Dyar & Knab. In Bromeliaceae.

Wyeomyia (*Protopolepis*) *jocosa* Dyar & Knab.

Wyeomyia (*Protopolepis*) *prolepidis* Dyar & Knab.

Wyeomyia (?*Wyeomyia*) *celaenoccephala* Dyar & Knab.

Wyeomyia (*Menolepis*) *culebrae* Dyar.

Goeldia (*Isostomyia*) *espini* Martini.

Goeldia (*Goeldia*) *lampopus* Howard, Dyar & Knab.

Goeldia (*Goeldia*) *leucopus* Dyar & Knab.

³ The figure given of *mogilaria* is the same.

A NEW SABETHID FROM BRAZIL

(Diptera, Culicidae)

By HARRISON G. DYAR

Dr. F. M. Root of the Johns Hopkins Medical School very kindly handed me a pair of *Wyeomyia* from Brazil, which Mr. F. L. Soper of the International Health Board bred from "water-bearing plants." Dr. Root has other specimens. It is possible that this species may be one of those listed by Peryassú; but I cannot decide this with any certainty from the published descriptions, and consider it best to offer the following characterization. If this is Peryassú's wrongly identified *Dendromyia smithii*, as seems most probable from his key, the new name is needed anyway.

***Wyeomyia mystes*, new species.**

Clypeus nude; postnotum with a tuft of setae posteriorly. Head dark scaled, eyes with a continuous narrow white border, joining a large white patch on the side. Prothoracic lobes dull violet; mesonotum dark scaled, the scales on pleura and coxae white. Abdomen dark above, whitish below, the colors separated on the sides in a nearly straight line, the dorsal color projecting slightly ventrally at the posterior angles of the segments. Legs entirely dark, the femora whitish beneath. Wing scales oval, rather broad, but not extremely so.

Male hypopygium. Nearest to *Dinomyia* in structure, but of much more elongated form. Stem stout and uniform, less than half the length. An expansion about the middle bears a spine and seta and a row of five setae along its margin; within this another expansion bears five stout setae. Beyond this, the shaft is enlarged, swollen and fimbriate on one side, ending in a truncate tip with double point and fimbriate margin. Below the double tip are two little filaments and a small rounded knob bearing cilia. Still below this, but above the mesial expansion, is a double arm, the basal part wide and fimbriate and with a small branch, the apical part smooth and curved.

Types, male and female adults in the U. S. National Museum; mounted male on a slide in the collection of Dr. Root.

THE NORTH AMERICAN SPECIES OF EMERSON-
OPSIS, AMESTOCHARIS, EUDERUS AND
MIROMPHALOMYIA

(Hymenoptera, Chalcididae)

By A. A. GIRAULT

The following tables, very probably as accurate as may be, were made up from type material in the U. S. National Museum, but were never subjected to final revision.

Genus *Emersonopsis* Girault

Arizona, Montana. Head as in *Pseudomphale*; sclerite from between antennae reaches apex of V-suture in an acute point. Parapsidal furrows complete, obtuse, obscure. Scutellum 2, submarginal vein 1, bristle or seta.

Dark green, abdomen black, wings clear; tarsi concolorous; venation dark. Pedicel slightly longer than funicle 1; face glabrous, cross-lined below antennae save clypeus, latter with rimmed apex; vertex smooth, occiput finely scaly; thorax coarsely reticulate-punctate save propodeum whose neck is rugulose; abdomen 2; pronotum and propodeum save groove on each side of meson, glabrous. Male, knees, tibiae at apex more or less red, abdomen with long petiole, glabrous; face with a hump just below and between antennae,

(*Entedon*) *cupreicollis* (Ashmead) = *arizonensis* (Ashmead)

Habits unknown. The precedence of the two names had not been determined up to the time I left, but can be easily done from the literature.

Genus *Amestocharis* Girault

Australia, North America. The following are species referable here for the present; but they bear three (3) ring-joints; the male funicle is 3-jointed, club 2-jointed. Head as in *Pleurotropis*.

Wings clear; legs concolorous, also scape. Jaws 2-dentate. All the species bear two bristles on scutellum and on submarginal vein.

Abdomen 2 half the surface, glabrous above, densely scaly beneath, rest scaly, abdomen not long; parapsidal impression glabrous caudad. Scu-

tellum with more or less distinct median sulcus at base. Median carinae of propodeum not very close, diverging distad. Post-marginal and stigmal short, subequal. Pedicel a little shorter than funicle 1. Tibial tips obscurely white. Petiole scabrous, subquadrate,

lithocolletidis (Ashmead) = *Entedon albitarsis* Ashmead

Abdomen 2 a quarter the surface, the abdomen long, scaly save proximal half of 2 and apex narrowly of others. Parapsidal impression punctate like rest of scutum; scutellum the same; median carinae of propodeum very close. Postmarginal exceeding stigmal. Pedicel much shorter than funicle 1. Tibial tips white.....*perdubius* Girault

Abdomen 2 the same but glabrous, abdomen still more slender, 3 scaly, others more widely glabrous at apex: tibiae entirely concolorous. Otherwise the same.....*longus* Girault

Genus *Euderus* Haliday

Cosmopolitan. Club with a distinct terminal nipple. Parapsidal furrows deep, complete. Abdomen conic-ovate. Head as in *Secodella*. Fore wing with the line of long soft setae near and parallel to marginal vein as in *Secodella*.

Ovipositor not extended, the abdomen not stylate.

Dark green, wings hyaline; scape slightly at base beneath, knees broadly, tips of tibiae and the tarsi (except last joint), whitish; densely scaly, the propodeum with a median carina. Funicle joints twice longer than wide, but 4 a half shorter, longer than pedicel; stigmal globular, subsessile, shorter than the postmarginal. Mandibles tridentate. Scutum scaly-punctate. Discal cilia of fore wing more distinct distad.....*elongatus* Ashmead

The same but middle legs save coxae, red, so scape beneath, pedicel longer, equal funicle 1; discal cilia all distinct, propodeum longer.....*marilandicus* Girault

Ovipositor extruded for length equal to fourth that of abdomen, latter stylate at apex.

The same but of whole body only the three basal joints of the tarsi are white; median carina of propodeum shorter, broader; funicle joints somewhat longer than wide, longer than pedicel; stigmal ovate, with distinct neck, oblique, a little shorter than postmarginal. Mandibles tridentate, teeth acute.....*livida* Ashmead

The species are, no doubt, associated with Lepidopterous larvae. The sparse and inconspicuous discal ciliation of the fore wing is characteristic. The cephalic tibial spur forms a strigil, is pale and strongly 2-tined (*elongata*). Scutellar bristles are

six (?) in *elongatus*, six minute in *marilandicus* and none in *livida*. Submarginal with three or more bristles in *marilandicus* and six in *livida*.

Genus *Miromphalomyia* Girault

Arizona. Head sublenticular. Perilampiform. Clypeus subtruncate, broad at apex, the head not as wide there as the eyes (cephalic aspect). Cheeks nearly as long as the eyes.

Submetallic, dark, the head aeneous, the wing hyaline; base, apex of tibiae, tarsi yellowish, scape, pedicel and ring-joints reddish brown. Funicle 1 longer than wide, 3 and 4 wider than long; club 4 linear, terminating in a long colorless spine; thorax coarsely punctate, the head more delicate scaly-punctate as also the propodeum. Latter with a median carina. Scutellum projecting over propodeum. Mandibles tridentate, the middle tooth distinctly longest, all acute. Hind tibiae not yellow at apex. Three long bristles in a row near marginal vein. Scutellum with no bristles; submarginal with five. Habits unknown,
perilampoides Girault

NOTE ON *CULEX TARSALIS* COQUILLET

(*Diptera, Culicidae*)

By HARRISON G. DYAR

The male genitalia of *Culex tarsalis* have never been described. The circumstances were as follows: Both *tarsalis* and *stigmatosoma* occur around San Francisco, California, and Miss Isabel McCracken, collecting there in 1901 for Dr. L. O. Howard, met with *stigmatosoma* first, and in abundance, owing to its habit of breeding in the pools left in river-beds after these have gone dry following the disappearance of the rainy season. She evidently did not suspect at first that there was a second similar species involved, and the species was identified as *Culex tarsalis* Coq., from Coquillett's description. Later she met with the true *tarsalis* in smaller numbers, in permanent water, and this form Prof. V. L. Kellogg sent to F. V. Theobald in England as a new species, which Theobald described, naming it *kelloggi*. In making our original studies for the Monograph (*stigmatosoma* was not differentiated until 1907), we failed to examine critically Miss McCracken's material, and followed

her misidentification of *tarsalis*. All the slides which were prepared as genitalic mounts of *tarsalis* were made from actual specimens of *stigmatosoma*, and from these the figures and descriptions in the Monograph were made. In my subsequent papers I failed to detect the error, and was continuously unable to separate *stigmatosoma* and *tarsalis* by the male hypopygium.

Male hypopygium of *Culex tarsalis* Coq. (California). Lobe of side-piece prominent, pilose, with two stout rods and a slender one, and a few small setae at base; no leaf, but two filaments grouped with the slender rod. Tenth sternites with spines on the inner side, but five or six flat teeth on the outer side; basal arm strongly recurved, darkly chitinized. Mesosomal plate with the horn from base strongly projecting; inner arm very long and strap-shaped, resembling the horn from base, pointed; outer arm thumb-shaped; three equal teeth between, in the shape of a small claw.

I have no records of *tarsalis* from south of the United States except just across the border, as at Tia Juana, Mexico. The species occurs from California to Texas, reaching the Gulf at the Rio Grande, extends northward along the Rockies and eastward to Illinois, and up through the central region to Canada, Saskatchewan to British Columbia. The northern limit in the west is the Fraser Valley.

Culex stigmatosoma Dyar.

Synonyms of this species are *Culex eumimetes* D. & K. and *Laiomyia* of Izquierdo. The species enters the United States on the Pacific coast where it ranges as far north as San Francisco. Also it enters Texas (race *thriambus* Dyar, differing in the larva, but with the same habit of breeding in the flood-pools in river-beds). It is dominant over the Mexican tableland, occurs in Guatemala and Costa Rica, and I have an undoubted specimen from Venezuela (from the Paris Museum). It has not been taken in Panama; but as its occurrence is conditioned by flood-pools in river-beds, there are probably wide gaps in its distribution.

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A NOTE ON SABETHES ROBINEAU-DESVOIDY

(*Diptera, Culicidae*)

By HARRISON G. DYAR

The genera *Sabethoides* and *Sabethinus* differ only in the long proboscis of the former. This character is not even of subgeneric value in *Wyeomyia*, and it will be more logical to unite these genera, as well as tend to simplify the subject. *Sabethes* differs from *Sabethoides* in the modification of the legs as "show-organs." The process begins with the mid legs, of which the femora are somewhat elongated as compared with the fore femora, and the development of "paddles" of scales at the tip of the tibia and basal tarsal joints. The larvae and the male hypopygia are similar throughout, as far as known. *Remipusculus* is intermediate in having only the beginnings of the paddle-shaped tuft. These groups seem to be worthy of not more than subgeneric value. Greater differences exist between the subgenera of *Goeldia*, *Goeldia* and *Isostomyia*.

KEY TO THE SPECIES OF AMERICAN SABETHES

- Mid femora longer than fore femora; mid legs with paddle-shaped tufts.....Subgenus **Sabethes** Robineau-Desvoidy
- Fore, mid and hind legs with tufts.
- Legs without white marks.....**lutzii** Theobald
- Legs with white markings.
- Fore tarsi with joints 2, 3 and 4 white or partly white, at least the third joint all white,
- goeldii** Howard, Dyar & Knab
- Fore tarsi with a white mark on the second joint, more or less extensive or partly involving the third joint, but the third joint not all white,
- schausi** Dyar & Knab, **ochausi** Theobald

Tufts on fore and mid legs, not on hind legs.

A white mark on mid tibia before the tuft,

tarsopus Dyar & Knab

No white mark in this position,

amazonicus Gordon & Evans, *koppleri* Bonne

Mid legs only with tufts.

Tuft large, on mid tibiae and base of tarsi.

No white on legs.

Larger; abdominal colors not incised laterally,

cyaneus Fabricius,

locuples Robineau-Desvoidy, *remipes* Wiedemann

Smaller; abdominal colors incised laterally,

albiprivus Theobald, *albiprivatus* Theobald

Mid tarsi white marked, a white tip on the tuft in female,
two white spots in male,

bipartipes Dyar & Knab, *chroiopus* Dyar & Knab

Tuft small, on mid tibia only,

remipusculus Dyar, *purpureus* Peryassú

Mid femora not longer than fore femora; legs without paddle-shaped
tufts .. Subgenus **Sabethoides** Theobald

Abdominal colors confused, purple, green, etc., the white lateral
spots distinct only basally.

Proboscis long, slender, nearly as long as abdomen; mid tarsi
white marked.....**chloropterus** Humboldt, *nitidus*

Theobald, *confusus* Theobald, *rangeli* Surcouf & Rincones

Proboscis shorter and stouter.

Mid tarsi white marked,

imperfectus Bonne-Wepster & Bonne

Tarsi without white.....**purpureus** Theobald

Abdomen dark above, pale below, the colors not confused.

Lateral abdominal colors roundedly incised, the ventral white
projecting into the dark color mesially on the segments.

Setae at wing base golden brown; mesonotum metallic
green.

Fifth hind tarsal joint white below,

undosus Coquillett

Tarsi all dark,

aurescens Theobald, *identicus* Dyar & Knab

Setae at wing base deep black.

Mesonotum metallic green.....**intermedius** Bourroul

Mesonotum metallic blue,

melanonymphe Dyar, *albiprivatus* Theobald

Lateral abdominal colors angularly incised, the ventral white
cutting the black anteriorly on the segments,

moerbista Dyar & Knab

Sabethes lutzii Theobald.

Sabethes lutzii Theobald, Mon. Culic., iii, 323, 1903.

Sabethes goeldii Howard, Dyar & Knab.

Sabethes goeldii Howard, Dyar & Knab, Mosq. N. & Cent. Am. & W. I., iii, 24, note, 1915.

Sabethes schausi Dyar & Knab.

Sabethes schausi Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 63, 1908.

Sabethes ochausi Theobald, Mon. Culic., v, 622, 1910.

Dr. W. M. Mann caught three specimens of this species in Bolivia, in which the white on the fore tarsi varies in extent as noted above in the table.

Sabethes tarsopus Dyar & Knab.

Sabethes tarsopus Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 62, 1908.

From Mexico, Central America and Panama. Farther south, the white mark on the mid tibia disappears, and the following form results:

Sabethes amazonicus Gordon & Evans.

Sabethes amazonicus Gordon & Evans, Ann. Trop. Med. & Par., xvi, 316, 1922.

Sabethes kappleri Bonne, Ins. Ins. Mens., xi, 122, 1923.

Sabethes cyaneus Fabricius.

Culex cyaneus Fabricius, Syst. Antliat., 35, 1805.

Sabethes locuples Robineau-Desvoidy, Mém. Soc. Nat. Hist. Paris, iii, 412, 1827.

Culex remipes Wiedemann, Ausser. Zweifl. Ins., i, 573, 1828.

Sabethes albiprivus Theobald.

Sabethes albiprivus Theobald, Mon. Culic., iii, 323, 1903.

Sabethes albiprivatus Theobald, Mon. Culic., iv, 595, 1907.

Sabethes bipartipes Dyar & Knab.

Sabethes bipartipes Dyar & Knab, Proc. Biol. Soc. Wash., xix, 136, 1906.

Sabethes chroioptus Dyar & Knab, Ins. Ins. Mens., i, 76, 1913.

Sabethes remipusculus, new name.

Sabethes purpureus Peryassú (not *Sabethoides purpureus* Theobald), Os Culic. do Brazil, 287, 1908.

Sabethes chloropterus Humboldt.

Culex chloropterus Humboldt, Voy. Rég. Équin., His., vii, 119, 1820.

Sabethes nitidus Theobald, Mon. Culic., ii, 347, 1901.

Sabethoides confusus Theobald, Mon. Culic., iii, 328, 1905.

Sabethoides rangeli Surcouf & Gonzales Rincones, Essai Dipt. Vul. Venez., 251, 1911.

Sabethes imperfectus Bonne-Wepster & Bonne.

Sabethoides imperfectus Bonne-Wepster & Bonne, Ins. Ins. Mens., vii, 165, 1920.

Sabethes purpureus Theobald.

Sabethoides purpureus Theobald, Mon. Culic., iv, 617, 1907.

Sabethes undosus Coquillett.

Sabethoides undosus Coquillett, Proc. Ent. Soc. Wash., vii, 186, 1906.

Sabethes aurescens Theobald.

Sabethinus aurescens Theobald, Mon. Culic., iv, 622, 1907.

Sabethes identicus Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 207, 1907.

Sabethes intermedius Bourroul.

Sabethinus intermedius Bourroul, Mosq. do. Brasil, 48, 1904.

This species is not described among the new species at the beginning of Bourroul's paper; but in the generic keys some characters of coloration and wing-scales are given, which may be construed as a specific description. *Intermedius* is the genotype of *Sabethinus*, and was so given by Blanchard (1905) before Theobald's full generic and specific description appeared (1907).

Sabethes melanonymphe, new name.

Sabethinus albiprivatus Theobald (not *Sabethes albiprivatus* Theobald), Mon. Culic., iv, 620, 1907.

Sabethes moerbista Dyar & Knab.

Sabethinus moerbista Dyar & Knab, Ins. Ins. Mens., vii, 2, 1910.

NOTES ON SOME SABETHIDS FROM CENTRAL AMERICA

(Diptera, Culicidae)

By HARRISON G. DYAR

In originally determining the small Sabethids of the genus *Wyeomyia*, the late Fredrick Knab and the writer were not familiar with specific limitations, and it now proves that we proposed too many names. The probable alternative would have been that we would have proposed too few, which would have been worse; for synonymy is definite, if a little cumbersome, but the difficulties of misidentifications and confusion of species are harder to weed out, and often persist almost indefinitely in the literature.

I have noted the synonymy of the Panama forms as determined to date (Ins. Ins. Mens., xi, 167, 1923), and will here discuss the forms described from Central America and Mexico.

***Wyeomyia guatemala* Dyar & Knab.**

Wyeomyia guatemala Dyar & Knab, Proc. Biol. Soc. Wash., xix, 139, 1906.

Wyeomyia adelpha Dyar & Knab, Proc. Biol. Soc. Wash., xix, 140, 1906

*Wyeomyia ablabe*s Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 66, 1908.

Wyeomyia ablechra Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 66, 1908.

From Mexico, Guatemala, Costa Rica and Salvador. The coloration and wing-scales is as in *homothoe* of Panama; but the single slides show a slight difference in the male hypopygium. The difference may not be actual, but due to a partial folding back of the "core arm" of the clasper. In *guatemala* (See Ins. Ins. Mens., vii, Plate v, fig. 8, *adelpha*), the "core arm" curves smoothly along the elliptical tip of clasper, but in *homothoe* (l. c., fig. 7, *rolonca*), it is partly frayed out, and projects down along the stem, although it does not actually touch the stem as the figure seems to indicate. I have but one slide of the latter, and further material may show that but a single species is involved. Knab's fine series of *ablabe*s, bred in Mexico, was almost totally destroyed by museum pests during his illness.

Wyeomyia homothe Dyar & Knab.

Wyeomyia homothe Dyar & Knab, Journ N Y. Ent. Soc., xv, 211, 1907

Wyeomyia rolonca Dyar & Knab, Proc Ent Soc Wash, xi, 173, 1910

This species was formerly common in the Canal Zone, Panama. Mr. Busck obtained a long series of females at Lion Hill, flying in bamboo woods, in 1907. It is now rare, though occasionally found on both the Atlantic and Pacific sides. Zetek caught a specimen at Balboa in 1913, and Shannon secured one at Panama in 1923. Zetek got one at Gatun in 1919 and two at Fort Sherman in 1920. Shropshire got one at Monte Lirio and two at Cativa in 1921. Shannon found a small series in 1923 at Close's Plantation, Cano Saddle, an out-of-the-way place up the Trinidad River.

The larva is described by Dyar & Shannon (Ins. Ins. Mens., xii, 89, 1924); but probably the comb is not broken as there thought, for the structure in *guatemala* is normal (See larva of *ablates*, Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., ii, Plate 88, fig 281, 1912), and the larvae of the two are probably inseparable.

Wyeomyia abebela Dyar & Knab

Wyeomyia abebela Dyar & Knab, Proc U S Nat Mus, xxxv, 67, 1908

This species is known only by the series bred by the late Fredrick Knab in Mexico. Unfortunately only the male type (abdomen on a slide) remains, the other specimens having been destroyed by museum pests during Mr. Knab's last illness. According to the description, the tarsi of the female are entirely dark, which distinguishes the species from *celaenocephala*, to which it is nearest in coloration. The male hypopygium is very distinct (Ins. Ins. Mens., vii, 129, 1919).

Wyeomyia celaenocephala Dyar & Knab.

The synonymy *celaenocephala*=*philophone*=*megalodora*=*malata* *melanopus* has been previously made (Ins. Ins. Mens., xi, 172, 1923). The species extends to Panama, but is not well known.

Wyeomyia gynaeopus Dyar & Knab.

Wyeomyia gynaeopus Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 66, 1908.

Wyeomyia baria Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 69, 1908.

In this species the wing-scales are broad; prothoracic lobes dull dark blue; white on hind tarsi only, the fourth and fifth joints being white beneath, but dark at their apices. It thus falls next *Decamyia*, differing in that the white of the tarsi is not continuous. From Costa Rica and Salvador, each name represented by a single caught female, without data on males or larvae.

Wyeomyia hemisagnosta Dyar & Knab

Wyeomyia hemisagnosta Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 230, 1906.

Founded on a larva found in a cocoanut-husk, Sonsonate, Salvador, but not bred. The larva (Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., ii, Plate 93, fig. 303) has the hairs single on a rather short and stout tube (the lower double one in the figure is an error); comb of the eighth segment in a narrow patch (in the central part there are in at least one instance, scales two deep, not shown in the figure); dorsal anal hairs in 3-2. Evidently on these characters, the adult should have broad wing-scales, for the species with narrow wing-scales (*Wyeomyia*) have the anal hairs 1-1. The eighth segment has no plate, excluding *Pentemyia* and *Miamyia*. The tube has no posterior fringe, excluding *Calladimyia* and *Dinomyia*. The comb-scales are not few, excluding *Limatus* and *Lemmamyia*. *Triamyia* has the anal hairs 4-4, and *Hystatomyia* has a long slender tapering tube. There remains, then, only *Decamyia* with which this larva can be compared. *Decamyia*, however, has false pecten teeth on the air-tube and a broader scale patch on the eighth segment, two to three rows deep. A form close to *Decamyia*, but yet different, is *gynaeopus*, above mentioned, and it seems probable, therefore, that *hemisagnosta* is the larva of *gynaeopus*. One of the type localities of *gynaeopus* (*baria*) is Sonsonate, Salvador, whence the *hemisagnosta* larva

was obtained. No larva with the characters of *hemisagnosta* has been taken in Panama, and *gynaecopus* does not occur in Panama. If this circumstantial evidence be taken as conclusive, the name *hemisagnosta* will take precedence for the species.

At one time I suggested (Ins. Ins. Mens., vii, 140, 1919) *hemisagnosta* might be the larva of *Lemmamyia*; but that has since been found, and proves to be quite different (Ins. Ins. Mens., xii, 90, 1924).

It is probable that when the male is found it will represent a separate subgenus.

NOTES ON THE SABETHIDS OF THE WEST INDIES

(*Diptera, Culicidae*)

By HARRISON G. DYAR

The Sabethid mosquitoes are not represented by many forms in the West Indies. Apart from one predaceous form (*Goeldia perturbans* Will) and another (*Sabethes bipartipes* D. & K.), possibly also predaceous, the species all belong to *Wyeomyia* (sensu lat.). Names have been proposed for each species on each separate island, and while it is possible that each island has a separate form or race, there is nothing to indicate it in the information so far at hand. The species and insular forms arrange as follows:

Prothoracic lobes larger, more or less approximated dorsally.

Wing scales narrow.

Prothoracic lobes silver scaled.

Mid and hind tarsi white-marked.

<i>vanduzeei</i> Dyar & Knab.....	Florida
<i>fratercula</i> Dyar & Knab.....	Martinique
<i>sororcula</i> Dyar & Knab.....	Santo Domingo
<i>argyrura</i> Dyar & Knab.....	Cuba
<i>conchita</i> Dyar & Knab.....	

Hind tarsi only white marked.

<i>bahama</i> Dyar & Knab.....	Bahamas
<i>minor</i> Dyar & Knab.....	Cuba

Prothoracic lobes not silvery; blue or bluish-scaled.

Mid and hind tarsi white marked, the hind tarsi spotted, the spots variable, sometimes very small or absent.

mittchellii Theobald Jamaica
abia Dyar & Knab.....Dominica
ochrura Dyar & Knab.....Santo Domingo
glaucocephala Dyar & Knab.
violascens Dyar & Knab.....Cuba
antometta Dyar & Knab.....Florida

Tarsi all dark.

pertinans Williston.....St. Vincent
grayii TheobaldSt. Lucia

Wing scales broad.

Tarsi closely scaled.

grenadensis EdwardsGrenada

Mid tarsi with paddles.

bipartipes Dyar & Knab.....Santo Domingo

Prothoracic lobes sublateral.

perturbans WillistonSt. Vincent

In regard to the subgeneric station of the species, *vanduzeei* and presumably *bahama* (its male is not yet known) belong to *Dendromyia* as used by me (Ins. Ins. Mens., vii, 124, 1919); *mittchellii* and *pertinans* belong to *Wyeomyia* proper (*grayii* is the genotype); *grenadensis* belongs to *Dodecamyia*.

***Wyeomyia vanduzeei* Dyar & Knab.**

From Florida, Cuba, Santo Domingo and Martinique. It has not been taken in Jamaica, nor in the Virgin or Leeward Islands. No continental species is known with the prothoracic lobes all silvery scaled. The larvae live in the water at the leaf-bases of epiphytic Bromeliaceae.

***Wyeomyia bahama* Dyar & Knab.**

The species inhabits the eastern tip of Cuba and the Bahamas. The larva and life history as well as the male are unknown, but all are probably as in *vanduzeei* or closely similar. This seems to be a derivative species of *vanduzeei*, the distribution being the same as between *Aedes condolecens* D. & K. (Cuba and Bahamas) occurring alone in the Bahamas, but associated with *Aedes scapularis* Rond. in Cuba, as *Wyeomyia bahama* occurs alone in the Bahamas, but associated with *vanduzeei* in Cuba.

Wyeomyia mitchellii Theobald.

From Florida, Cuba, Santo Domingo, Jamaica and Dominica, not taken in the Bahamas, Virgin or Leeward Islands, of which the two latter groups seem to be bare of Sabethids. Two names were proposed for the Santo Domingoan form, *ochrura* founded on the larva and *glaucocephala* on the adult. The white spots at the bases of the hind tarsal joints are very variable, sometimes very large, sometimes minute or absent, the variation being independent of locality, as great a range occurring in Florida as in Santo Domingo. The larvae live in the leaf bases of epiphytic Bromeliaceae, both this species and *vanduzeei* occurring together in the same plants.

Wyeomyia pertinans Williston.

From St. Vincent and St. Lucia, apparently confined to the Windward Islands. Bonne-Wepster and Bonne have described the male (Ins. Ins. Mens., ix, 10, 1921). The larvae are preyed upon by *Goeldia perturbans* Williston, but the habitat is not definitely stated.

Wyeomyia grenadensis Edwards.

I have referred this to the synonymy of *clasoleuca* D. & K. (Ins. Ins. Mens., vii, 139, 1919), and Bonne-Wepster & Bonne say that this is probably correct (Ins. Ins. Mens., ix, 10, 1921). In their list of the mosquitoes of Surinam (Ins. Ins. Mens., xi, 123, 1923), Bonne-Wepster & Bonne record *clasoleuca* from Surinam; but apparently they had females only, and they re-described the same form as *Dendromyia roucouyana* (Ins. Ins. Mens., vii, 166, 1920), again from females, although with the larva. Thus the corresponding male from Surinam is not known, and the male of *grenadensis* is also unknown. Until the males are known, the synonymy must remain uncertain; but *grenadensis* is doubtless a *Dodecamyia*, and probably the same as *clasoleuca*. I do not believe that it is an endemic form.

The larva (according to Bonne-Wepster & Bonne) lives in Bromeliaceae, having an air-tube of the *Hystatomyia* type, but single comb of the eighth segment, 12 large scales in a straight line.

Sabethes bipartipes Dyar & Knab.

The occurrence of a *Sabethes* in the West Indies is unexpected; but we have two records from Santo Domingo (Campbell and Busck). The species has been taken in Ecuador, Surinam and British Guiana. Doctor and Mrs. Bonne found pupae in rather clear water held by a fallen banana-leaf, associated with *Limatus* and *Lemmamyia*, and again in water in a hole in a fallen tree. They say that the larvae are predaceous (Ins. Mens., ix, 98, 1921) and were feeding on several species of *Culex*, and even on *Uranotaenia lowii*, as the water contained many green algae in the latter case. We do not feel certain of the predaceous habit, in spite of Dr. Bonne's apparently positive statement, for *Sabethinus undosus*, with identical mouth-parts, is certainly not so. The statement may possibly mean no more than that the *Sabethes* occurred with the others. Positive observations on this point are desirable, as the larva of no other species of *Sabethes* is known.

Goeldia perturbans Williston.

Predaceous as larva upon *Wyeomyia pertinans* Will. in St. Vincent. This is an apparently endemic form, peculiar to the Windward Islands, its nearest relative being *Goeldia homotina* D. & K., recorded from Panama and Surinam.

PHONIOMYIA AND DENDROMYIA THEOBALD

(*Diptera, Culicidae*)

By HARRISON G. DYAR

Phoniomyia Theobald.

The identification of this Sabethine genus is becoming obscure. Theobald restricted his genus *Wyeomyia* (Mon. Culic., iii, 310, 1903) to *grayii* and *pertinans* (which are doubtless synonyms), and erected the genus *Phoniomyia* for *longirostris* and *aranoides*. The former has been fixed as the type.

Theobald described *Wyeomyia longirostris* (Mon. Culic., ii, 275, 1901), and at the time of erecting *Phoniomyia*, he made *trinidadiansis* (Mon. Culic., ii, 277, 1901) a synonym thereof.

Bonne-Wepster and Bonne discuss these species (Ins. Ins. Mens., ix, 6-8, 1921), and in regard to *longirostris*, they found the types to consist of a female and a male. They restricted the type to the female, and determined the male to belong to Theobald's *trinidadensis*; but it is not clear whether this male was from Trinidad or Brazil. Theobald does not mention a male nor a specimen from Trinidad in his description of *longirostris*, but did have more than one specimen from Dr. Lutz, all "more or less damaged." Therefore I think that Bonne-Wepster and Bonne should not have identified the male *longirostris* with *trinidadensis* on account of the discrepancy in locality. Their restriction of the type of *longirostris* to the female must hold, unfortunately as it now appears.

The male specimen, now rejected as type, is a *Dodecamyia* from Brazil, probocis long, abdominal colors incised, mid tarsi with white on the second to fourth joints, hind tarsi with basal parts of fourth and fifth joints white. This corresponds with the Mana type of *quasilongirostris* Theob. (Mon. Culic., iv, 598, 1907), of which the specimen is probably the male; but it leaves *trinidadensis* without a known male.

The type of *Phoniomyia*, then, is a female with long probocis and broad (so stated) wing-scales, the abdominal colors separated in a straight line. The color of the tarsi is unknown. Theobald does not mention any white, but the male which he had before him and which he used in describing the abdomen has white marked tarsi, and it is probable that he overlooked this character in the early part of his work.

This renders the identification of *Phoniomyia* sufficiently obscure. The long proboscis, far from being of subgeneric value in *Wyeomyia* as Edwards has supposed (Bull. Ent. Res., xiii, 76, 1922), occurs in *Dodecamyia* (but not all the species), in *Dyarina* and in my use of *Dendromyia* (Ins. Ins. Mens., xi, 65 and 172, 1923).

Most probably *Phoniomyia* is a *Dodecamyia* with long proboscis and abdominal colors separated in a straight line, but with broad (so stated) wing scales and from Brazil. Theobald figures the wing-scales of *longirostris*, female (Mon. Culic., iii, Plate xv, 1903). The end of the cell is shown, but not the

bases of the fork-cells. The appressed scales are narrowly triangular, the outstanding ones sparse and narrowly ligulate. Theobald used the terms "broad" and "narrow" somewhat loosely. In describing those of *Phoniomyia* as broad, he evidently referred to the appressed scales, whereas it is the outstanding ones that we are accustomed to regard as diagnostic.¹ An appearance almost identical with Theobald's figure is presented by *Dodecamyia aphobema*, and presumably by *bodkini* also, although this is not before me. In case either of these species shall be found to extend its range to Brazil, the identity of *longirostris* will be solved. In any case it must be a representative species of these, and *Phoniomyia* will replace *Dodecamyia*.

The following table is for the species of *Phoniomyia* (*Dodecamyia*):

Wing scales narrow (outstanding ones); mid tarsi white marked, hind tarsi dark; proboscis very long; abdominal colors separated in a straight line ... (longirostris Theobald)

Male clasper slender outwardly with few small setae; fifth mid tarsal joint with one claw very large and with four spines below ... aphobema Dyar

Male clasper swollen outwardly with several stout setae; fifth mid tarsal with the claws subequal in length and one stout spine beneath ... bodkini Edwards

Wing scales broad; mid and hind tarsi white marked.

Proboscis shorter than abdomen; abdominal colors separated in a straight line... clasoleuca Dyar & Knab, grenadensis Edwards, roucouyana Bonne-Wepster & Bonne

Proboscis longer than abdomen; abdominal colors incised, the black triangles posteriorly on the segments.

Hind tarsi with white on the bases of second and third joints as well as fourth and fifth; male hypopygium side piece with spinose subapical lobe,

splendida Bonne-Wepster & Bonne

Hind tarsi without white on second and third joints; side piece in male without spinose lobe (?)... (Trinidad) trinidadensis Theobald, (Brazil) quaslongirostris Theobald

¹ Bourroul notes already (Mosq. do Brasil, 56, 1904) that the outstanding scales in *Phoniomyia* and *Hyeomyia* are narrow

The following table is for the species of *Dyarina*:

Proboscis very long; abdominal colors incised, the black triangles posteriorly on the segments.

Mid and hind tarsi white marked.

Male hypopygium with the basal arm again divided (?),

pallidoventer Theobald

Basal arm of clasper single; tenth sternites with two teeth; ninth tergites with spines nearly four times as long as the prominence..... **lassalli** Bonne-Wepster & Bonne

Hind tarsi dark; male with a little white on base of third mid tarsal beneath, absent in female. **leontiniae** Brèthes

tripartita Bonne-Wepster & Bonne, **fuscipes** Edwards

Leontiniae is from Argentina (Bol. Inst. Ent. y Pat. Veg., i, 41, 1912), *tripartita* from Brazil, and *fuscipes* from Paraguay. I suspect that they represent one species, although the male is known only of *tripartita*. In that, the tenth sternites have six teeth, the ninth tergites with the spines less than twice as long as the prominence.

Dendromyia Theobald.

Theobald proposed the genus *Dendromyia* (Mon. Culic., iii, 313, 1903) without specifying the type, including five species, *ulocoma*, *asullepta*, *paraensis*, *quasiluteoventralis*, and *luteoventralis*. In the description he says it differs from *Phoniomyia* in the much shorter proboscis and more densely scaled wings, and makes reference both under the generic heading and specifically in the text to Plate XV, showing the broad scaling of *Dendromyia ulocoma*. In spite of this plain indication of which species Theobald considered typical of his generic conception, Blanchard (Les Moust., 426, 1905) specified *luteoventralis* as the type. Under the rules, this specification must hold.

Wyeomyia luteoventralis (Mon. Culic., ii, 348, 1901) was founded on three females from Para, Brazil. The wing scales are said to be broad, resembling those of *Goeldia lunata*; abdominal colors separated in a straight line; no white mentioned on tarsi; proboscis presumably not long; first abdominal segment bright testaceous, a few scales showing violet reflections. The color of the prothoracic lobes is not mentioned.

Later (Mon. Culic., iii, 318, 1903), Theobald adds several new localities, British Guiana, Trinidad, São Paulo, Brazil, and gives a figure of a wing showing typical narrow outstanding scales. He also describes *quasiluteoventralis* from British Guiana, differing (only?) in the relative lengths of the "hind metatarsi and tibiae." Blanchard (1905) made the two names synonymous; but this added material, possibly not all conspecific, so confused the subject that Doctor Howard's subsequent notes are indecisive. Doctor Howard reports, his report covering both *luteoventralis* and *quasiluteoventralis* (Mosq. No. & Cent. Am. & W. I., iii, 71, 1915): "Prothoracic lobes with purplish coppery scales; middle tarsi with the three terminal joints whitish." In this place, Howard, Dyar and Knab consider *luteoventralis* as near the Panama *chrysomus*, and this idea was followed out by me in subsequent subgeneric work in my use of *Dendromyia* (Ins. Ins. Mens., vii, 124, 1919; xi, 65, 172, 1923). Doctor and Mrs. Bonne report (Ins. Ins. Mens., ix, 11, 1921): "The legs are unbanded; median distinct white line on occiput; colors of the abdomen separated in a straight line; prothoracic lobes with coppery tips."

Unfortunately Doctor and Mrs. Bonne do not specify the shape of the outstanding scales at the base of the fork of second vein. It would seem that these are broad. Theobald's reference to *Dendromyia* may not be decisive; but Doctor Lutz apparently recognized the species, for in Peryassú (page 74) he gives, besides Theobald's original locality, Pará, also "São Paulo (Lutz)." Doctor Lutz carefully distinguished the genera on the characters of the wing scales, using the outstanding ones as diagnostic. In the Bourroul paper, he separates *Phoniomyia* (properly *Dyarina*) and *Wycomyia* on this character, placing *Dendromyia* in the broad scaled section, and in the Peryassú paper he repeats the separation, adding *Menolepis* to the narrow scaled section (page 38). In the description of *luteoventralis* (page 305), the scales are described as "rather large," which sounds like a translation of Theobald's original. Peryassú states that he emended and corrected Theobald's descriptions "in most cases;" but apparently this description was not

so corrected. Anyway, Doctor Lutz apparently thought to recognize *luteoventralis* in a broad scaled form.

No species with these characters is known to me, and it may be that *luteoventralis* remains to be rediscovered. Until this is done and the male made known, the proper application of *Dendromyia* perhaps cannot be made.

In any case, my use of *Dendromyia* is invalidated, and for the group which I treated under this name I propose the subgeneric name **Phyllozomyia**, type *smithii* Coquillett, the other known forms being *chrysomus* D. & K. of Panama, and the West Indian species with silvery prothoracic lobes, of which only *vanduzeei* is known in the male.

In regard to the other species placed originally in *Dendromyia* by Theobald, *paraensis* has been referred to *Limatus* (Bonne-Wepster & Bonne, Ins. Ins. Mens., ix, 5, 1921) and *asullepta* to *Lemmamyia* (l. c., 6). Both of these species have narrow outstanding scales at the base of the fork of second vein, although the scales outwardly are distinctly broad, which has a bearing on the statement that the scales of *luteoventralis* are broad.

The identity of *ulocoma* has not been positively fixed. It was described from British Guiana. I suggested that it might be *Cleobonnea occulta* (Ins. Ins. Mens., vii, 134, 1919); but Bonne-Wepster and Bonne pointed out that this could not be the case (Ins. Ins. Mens., ix, 10, 1921). They considered the species unrecognizable; but a broad scaled species with dark tarsi and lobes essentially the color of the mesonotum would fit very well in *Decamyia*. The *Decamyia* lobes have a slight blue tint, but not marked unless looked for, so that we described the lobes as the color of the mesonotum in the Monograph. Of the three *Decamyia*, which all extend from Panama to Trinidad, *pseudopecten* has a distinct whitish stripe on the occiput, which is stated to be absent in the original description of *ulocoma*. This stripe, however, is not visible or very faint in most specimens of *onidus* and *eloisa*, either of which species would fit *ulocoma*. It is next to impossible to choose. "The specimens were taken by Dr. Low in the forest near Demerara River at twelve noon in subdued light." *Onidus* lives in the

red-flowered *Heliconia* (*Bihai*), while *eloisa* lives in the yellow-flowered *Calathea*. Either or both of these plants may have been growing in the vicinity of the collecting ground.

According to Doctor and Mrs. Bonne (*Ins. Ins. Mens.*, ix, 11, 1921), only a female specimen is present in the British Museum collection to represent *quasiluteoventralis*, from a different locality from any of the three mentioned in the original description. They say that this female may be *Wyeomyia oblita* Lutz, a species with narrow wing-scales, as to the outstanding ones, though the appressed ones outwardly are rather broad. Theobald says: "Wings with broadish brown scales on the forks and on the third long vein." There is nothing here to contradict the reference to *oblita* Lutz, or rather *fallax* B.-W. & B., since I think that their reference of their species to *oblita* is scarcely justified. The discrepancy in locality is too great, as the other species of *Wyeomyia* are distinctly local. However, *quasiluteoventralis* is doubtless *fallax*, and a definite reference of it may be made.

A NOTE ON WYEOMYIA THEOBALD

(*Diptera, Culicidae*)

By HARRISON G DYAR

Further study has reduced the probable number of good species existing in *Wyeomyia* proper. In first listing this group as a subgenus (*Ins. Ins. Mens.*, vii, 127, 1919), twenty-seven species were recognized on adult coloration. The character used by Doctor A. Lutz (in the papers by Bourroul and Peryassú) of the narrow outstanding wing-scales is characteristic of the subgenus, although other subgenera possess it also. The claspers of the male hypopygium have a long slender stem, not existing in the other groups. Three types of clasper-tip exist. In the first, the tip is triangularly distorted, one angle drawn backward and ending in a flat plate that looks like a hole, a spine on the other side tied to the main body of radiating ligaments. This type occurs in but one species, *abcbela* of Mexico.

The second type of clasp tip is triangularly expanded with a short arm on either side, a row of setiferous tubercles through the middle; a fourth pilose arm, the "core arm," lies across the disk, or may be displaced. The main disk is squarely ended, as shown in the species *scotinomus* and *camptocomma*, or one angle may be produced, carrying another row of setae, as in *quasiluteoventralis*, *pertinans* and *mitchellii*.

In the third type, the tip forms a bud-shaped mass, either with a short arm on either side as in *guatemala*, or with these arms absorbed, as in *simmsi* and *melanopus*.

The species differ in the coloration of the legs; but these differences in coloration do not run parallel to the male genitalia, but rather traverse of them. A combination of the two sets of characters separates the species as follows:

Tarsi all dark.

Male clasper of Type I *abebela* Dyar & Knab

Male clasper of Type II *pertinans* Williston

Male clasper of Type III *melanopus* Dyar

Mid tarsi only white marked.

Male clasper of Type II

quasiluteoventralis Theobald

telestica Dyar & Knab

? *oblita* Theobald

? *celaenoccephala* Dyar & Knab

(The form of *mitchellii* without white on the hind tarsi falls here, and is difficult to distinguish except by locality.)

Hind tarsi only white marked.

Male clasper of Type II (square end) *scotinomus* Dyar & Knab

Male clasper of Type III *simmsi* Dyar & Knab

Mid and hind tarsi white marked.

Male clasper of Type II (square end) *camptocomma* Dyar

Male clasper of Type II (produced end) *mitchellii* Theobald

Male clasper of Type III *guatemala* Dyar & Knab

Wyeomyia abebela Dyar & Knab.

See "Notes on some Sabethids from Central America" preceding, page 102.

Wyeomyia pertinans Williston.

See "Notes on the Sabethids of the West Indies" preceding, page 105.

Wyeomyia melanopus Dyar.

I made the suggestion (Ins. Ins. Mens., xi, 173, 1923) that this might be the male of *celaenocéphala* from Central America and Panama; but I now consider this to be unlikely. There is no trace of white on the mid tarsi, the specimen being in good condition. The other species do not differ sexually in this manner. Moreover, the proboscis in *melanopus* is very long and slender, not corresponding with that of *celaenocéphala*, which is shorter than the abdomen. I will therefore hold this species apart on the single male type pending the receipt of further material.

Wyeomyia quasiluteoventralis Theobald.

Dendromyia quasiluteoventralis Theobald, Mon. Culic., iii, 317, 1903.

Wyeomyia fallax Bonne-Wepster & Bonne, Ins. Ins. Mens., vii, 110, 1919

See "Phoniomyia and Dendromyia" preceding, page 113, for the reference of *fallax* to synonymy. The species occupies British and Dutch Guiana.

Wyeomyia telestica Dyar & Knab

Wyeomyia telestica Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 230, 1906

Wyeomyia abascanta Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 65, 1908

The tip of the male clasper is of the type of *quasiluteoventralis*, but differs in detail. The production of the corner of the disk is more lateral and angular. There are a pair of finger-shaped processes on top of the mesosomal appendages, not on the "harpes" (tenth sternites) as stated by me in proposing the subgenus *Diphalangarpe* on this character (Ins. Ins. Mens., vii, 126, 1919). The slide of *abascanta*, which was mislaid at the time of writing, has now been found. It agrees with *telestica* in these characters, except that, being more strongly pressed, the finger-shaped processes are more prominent. The structure does not seem to be present in *quasiluteoventralis*. The species is from Trinidad, and identifications of *telestica* from the mainland (Bonne-Wepster & Bonne, Ins. Ins. Mens., xi, 124,

1923; Edwards, Bull. Ent. Res., xiii, 80, 1922) are probably erroneous.

Wyeomyia oblita Theobald.

Dendromyia oblita Theobald, Mon. Culic., iv, 612, 1907.

Dendromyia medioalbipes Peryassú, Os Culic. do Brazil, 303, 1908.

This is the Brazilian form corresponding to *quasiluteoventralis* and *telestica*, and doubtless, when males are at hand, it will prove to be specifically distinct.

Wyeomyia celaenocephala Dyar & Knab.

Wyeomyia celaenocephala Dyar & Knab, Proc. Biol. Soc. Wash., xix, 140, 1906.

Phoniomyia philophone Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 209, 1907

Wyeomyia megalodora Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 69, 1908

Wyeomyia mataca Dyar & Knab, Proc. U. S. Nat. Mus., xxxv, 70, 1908.

This is the corresponding form from Panama and Central America. After removing *melanopus* as the possible male, no male is known; but I now think that it will prove to be of the type of *quasiluteoventralis*, though specifically distinct.

Wyeomyia guatemala Dyar & Knab.

See "Notes on some Sabethids from Central America" preceding, page 101, *guatemala* and *homothe* presumably not being separable.

Wyeomyia mitchellii Theobald.

See "Notes on the Sabethids of the West Indies" preceding, page 105.

Wyeomyia camptocomma Dyar.

See "Some new mosquitoes from Colombia" following, page 120, where this species is described.

Wyeomyia scotinomus Dyar & Knab.

See remarks by Dyar & Shannon on the synonymy (Ins. Ins. Mens., xii, 88, 1924).

Wyeomyia simmsi Dyar & Knab.

Roloncetta is doubtless the male of *simmsi*, which is distinct on larval characters as well (Ins. Ins. Mens., xi, 173, 1923).

NOTE ON THE AMERICAN AEDES OF THE SCAPULARIS GROUP

(*Diptera, Culicidae*)

By HARRISON G. DYAR

In treating of this group recently (Ins. Ins. Mens., x, 51-60, 1922), I was unable to give a table for separation of the species by the male genitalia. As between the major species, this probably cannot be done; but as between the minor species, certain differences appear, and I am now inclined to regroup the forms from the arrangement used in that paper, and to give specific rank to some forms that I considered racial. A subgeneric name is available for this group, if desired, namely *Pseudo-howardina* Theobald, type *trivittatus* Coq.

Aedes obturbator Dyar & Knab.

No additional information is available about this form.

Aedes trivittatus Coquillett.

In the typical form from the United States, the claspette filament is normally and slenderly inserted on the stem, the spine on the basal lobe of the side-piece is moderately stout and the setae on the lobe rather long. The form is confined to the United States as far as my material shows. The only synonym is *inconspicuus* Smith & Grossbeck

Aedes angustivittatus Dyar & Knab.

In the specimens from Mexico, Costa Rica and Panama, the filament of the claspette is short and inserted in a cup-shaped expansion at the tip of the stem; the spine of the basal lobe is much stouter. I am therefore inclined to give this form specific rank, with *cuneatus* D. & K. and *argentescens* D. & K. as synonyms. In the type of *angustivittatus* the yellow lines of the mesonotum are narrow and straight, while in the other

named forms they are irregular and widened; but the marking is inconstant, and I think the differences are due only to variation.

Aedes thelcter Dyar.

The characters of this species are fairly distinct. The lobe of the side-piece is raised and prominent, with all the setae on the terminal aspect; the spine is situated at the base of the elevation, and is small in comparison with the usual state. The retrose spine of the filament of the claspette is reduced, only two little points showing.

Fresh material of the species has been received from Brownsville, Texas, through Mr. R. L. Turner, collected February 12, 1924.

Aedes scapularis Rondani.

This is the tropical continental form, which is before me from Argentina, Brazil, Bolivia, Trinidad, British Guiana, Venezuela, Colombia and Ecuador. The abdomen of the female is black above, with a more or less distinct dorsal median dull violaceous whitish stripe. In the male hypopygium the basal lobe is very small, the setae few and short, not a quarter the length of the rather slender spine. Synonyms are *confirmatus* Lynch and *camposanus* Dyar. The claspette filament has a minute retrose spine or only a slight notch, sometimes hard to detect.

Aedes scapularis hemisurus Dyar & Knab.

The Antillean form, which I have from Santo Domingo, Jamaica and Cuba (but males only from Jamaica), has been considered as the same as *scapularis*; but in the male the setae of the basal lobe are more numerous (16-20; about 10 in *scapularis*) and the spine is slightly stouter; on which characters a race seems indicated. A synonym is *indolecsens* D. & K. (Cuba; no male before me).

Aedes euplocamus Dyar & Knab.

I am inclined now to rate this as a species instead of a subspecies as in my former paper. In the male, the setae on the

basal lobe are much longer, some of them reaching nearly to the tip of the spine, while the spines of the ninth tergites are also elongated. This, together with the larval differences noted, seems to indicate a species. The form is before me from Mexico, Costa Rica and Panama, the latter locality being a correction of former identifications. It is *euplocamus* which occurs in Panama and not *scapularis* as formerly supposed by me (Ins. Ins. Mens., xi, 181, 1923). A male has recently been submitted to examination, Bella Vista, Canal Zone, June 3, 1922 (J. B. Shropshire). Heretofore neither male nor larva from Panama had been under observation.

***Aedes infirmatus* Dyar & Knab.**

This form also I am now inclined to rank as a species. In the male hypopygium, the spine is extraordinarily stout. The setae of the basal lobe are long, much as in *euplocamus*; but this peculiar spine, together with the larval differences, seems to indicate specific rank.

***Aedes condolecens* Dyar & Knab**

Males of this form are now before me, and a distinct species is indicated. The basal lobe of the side piece is distinctly projecting, with rather long setae, the spine is stouter than in *scapularis*, and the filament of the claspette is widely angled with two to six retrose spines instead of the single and often obscure one of *scapularis*. The species is distinct on adult coloration, having transverse white basal abdominal bands. It is before me from the Bahamas, where it occurs alone, and Cuba, where it is less abundant than *scapularis hemisurus*.

Concerning the forms of *tortilis*, *lynchii* and *crinifer*, there is nothing to add at present.

SOME NEW MOSQUITOES FROM COLOMBIA

(*Diptera, Culicidae*)

By HARRISON G. DYAR

Major L. H. Dunn has sent me a number of mosquitoes from Colombia which he met with in his work against the outbreak

of yellow fever there. He has kindly allowed me to describe the new forms among them. The mosquito fauna of tropical America is little known. There are a few exceptions, such as Brazil, where a number of able resident workers have studied the subject; Trinidad and British Guiana, through the researches of Urich, Moore and Bodkin; Surinam, through the excellent work of Doctor and Mrs. Bonne; Panama, through the American workers; and the Antilles, through Busck, Grabham, Pazos and Coffin. The present locality, Colombia, touches an unexplored spot. In a former paper (Ins. Ins. Mens., x, 192-194, 1922), I described three species from Colombia, *Culex* (*Carrollia*) *paraplesia* (= *Aëdinus amazonensis* Lutz), *Aëdes euiris*, and *Aëdes milleri*. None of them occurred in the present collection.

Wyeomyia (*Wyeomyia*) *camptocomma*, new species.

Wing-scales narrow; prothoracic lobes of the color of the mesonotum; colors of the abdomen separated on the sides in a straight line; mid tarsi with the tip of the second, the third to fifth joints white below; hind tarsi with the base of the third, the fourth and fifth white below, the white broadly interrupted at the tip of fourth joint.

Male hypopygium. Side piece three times as long as as wide, uniform, the tip narrowed and roundedly bent at right-angles. Clasper with a long and narrow stem, three-fourths as long as the side-piece, the tip broadly expanded as in *scotinomus* of Panama. The details differ from that species: The longer side arm is very stout, forming a broad bulging shoulder, while the smaller arm is folded over on the disk, hook-shaped and slightly fimbriate; the core-arm forms a large fimbriate pad, folded across the disk. Base of side-piece with three approximate setae. Tenth sternites simple, long, with dentate tip; second pair of appendages (mesosome?) shorter, stouter, with pointed tips. Ninth tergites with two stout spines on each side.

Larva. Head round; frontal hairs along anterior margin, one, two, three; a multiple tuft below base of antenna on the under aspect; a small tuft within the eye. Thorax quadrate; abdomen long, uniform; long lateral hairs double on fourth

and fifth segments, single on sixth and seventh; short hairs in tufts of three and four; comb of the eighth segment of many scales in a straight even line; air-tube moderate, about four times as long as wide, subfusiform, tapering outwardly; two basal hair-tufts double, the others single and coarse, no hairs on the outer fourth of the tube. Anal segment with two long hairs on each side at the dorsal angles, a single lateral one; subventral tuft small, multiple (in 12).

Five males, ten females and many larvae, taken from the bases of the leaves of elephant's ear plants (*Calladium*), Baranquilla, Colombia (L. H. Dunn).

Culex (*Culex*) *aglischrus*, new species.

Proboscis with a white area beneath, which sometimes shows slightly above; mesonotum brown, frequently with two whitish spots behind the middle; abdomen black, with narrow basal segmental white bands; tarsi with narrow white rings at both ends of the joints; wing scales dark.

Male hypopygium. Side piece stout, the lobe at the middle, at the apex of the basal excavation, long, slender, bearing three long stout rods with curved tips, the middle one weaker and shorter; a few setae on the lobe, continuous with the general vestiture (Plate IV, fig. 4). Clasper stout, with moderate inserted terminal spine. Tenth sternites large, with very long basal arm, but weakly chitinized, pale, with many short fine spines at tip and an unusual number of long setae on the side. Mesosome with the outer arm thick, shoulder-like, the lower stoutly thumb-shaped, denticles fine and appressed, scarcely separable, crowned by a delicate double hook; tooth very large and long, exceeding the body of the mesosome by half its length, slightly bent and with a mesial ridge running from the tip (Plate IV, fig. 3).

Larva. Head wider than long, widest through the eyes; antennae long, a tuft at the outer third, the part beyond somewhat more slender. Head hairs in fours, the tuft before the antennae multiple. Comb of the eighth segment of about 24 scales in a patch, sparsely placed. Air-tube straight, slightly tapering, about four times the length of the width at base; pilose

posteriorly beyond the middle, the pile becoming strong and abundant at the tip all around; pecten long, reaching over a third of the tube; hair tufts of four pairs, all beyond the pecten, pressed back posteriorly and irregular in alignment. Anal segment ringed by the plate, the ventral brush posterior; dorsally a long hair and a tuft on each side. Anal gills four, shorter than the segment.

Types three males and three females, selected from a series of 80, bred from a hole in the ground and a deep hole resembling a shallow well, Barranquilla, Colombia (L. H. Dunn). Also captured adults, Bogota, Apulo and Puerto Berrio, Colombia, during the season of 1923.

This species is obviously ancestral to *Culex coronator*, both on genitalic and larval characters. The coloration is much the same, but the specimens run larger, and the little light dots on the mesonotum are often characteristic. Since the adults were taken among hand catches, it is probable that the female bites. It appears that *coronator* has lost the habit of biting warm-blooded animals, for it did not occur among the hand-catches in Colombia, though Major Dunn found it one of the commonest as larva.

The mesosomal plate of the male hypopygium of the allied species of the *coronator* group is shown on Plate IV. These all have the tenth sternites membranous and thin, and no leaf on the lobe of the side piece, or merely a rudimentary one. The group seems to have branched off from *tarsalis*, by the degeneration of the tenth sternites. In *tarsalis*, the tenth sternites are normal, though the lobe of the side piece is without a well developed leaf as in these.

Aglischnrus is the most primitive in regard to the lobe of the side piece (Plate IV, fig. 4), which hardly differs from the condition in *Lutzia*. The mesosomal plate, however, is specialized, the disk reduced, but the horn from the base hypertrophied (Plate IV, fig. 3). In *surinamensis* and *coronator*, the structure is well developed; but whereas in *surinamensis* (Plate IV, fig. 2) the upper arm of the plate is shorter than the teeth, in *coronator* (Plate IV, fig. 1) it exceeds them. In *brevispinosus* (Plate IV, fig. 7) a quite different shape is given to the plate,

the upper arm being capitate, the lower rudimentary, while the horn is only moderately developed.

In *duplicator* (Plate IV, fig. 5) and *bonneae* (Plate IV, fig. 8), the plate is curved and composed of close denticles as is the case in *corniger*; but *corniger* has the tenth sternites normal and a well developed leaf on the lobe of the side piece, which would place it in another group. In *duplicator*, the horn takes the form of a triangular plate. The lobe of the side piece is simple (Plate IV, fig. 6), except for two little hair patches. *Duplicator* is found only in Santo Domingo, where Mr. Busck obtained it in 1905. We were pleased to receive recently fresh material from Port-au-Prince, Haiti, from Lieut. E. Peterson, no specimens of this form having come to hand in the intervening nineteen years.

Culex (Choeroporpa) sursumptor, new species.

Occiput dark brown, the scales oval, not very broad, but this type reaching the vertex. Mesonotum bronzy brown. Abdomen black, with basal segmental white hands, joining spots on the sides. Tarsi dark. Wing-scales dark, narrow on the base of the fork of second vein, becoming oval toward the tips of the fork.

Male hypopygium. Outer division of the lobe of side-piece with a short but distinct inner arm; middle filament and the four on the outer aspect forming a single group. Inner division closely approximated to the outer, strongly forked, bearing two twisted filaments with bent tips. Tenth sternites comb-shaped, slender; mesosome reduced to a stout hook on each side, exceeded by the recurved, spatulate-tipped basal hooks; ninth tergites a pair of elliptical setose pads.

Types, three females and a male, bred from a pool, Barranquilla, Colombia (L. H. Dunn), but no larvae were preserved.

Culex (Choeroporpa) ligator, new species.

The head and mesonotum are darker brown than in the preceding form, but there are no positive diagnostic colorational characters between the two.

Male hypopygium. Side piece as in the preceding; a seta at extreme base of outer division of lobe. Tenth sternites flattened comb-shaped, long. Mesosomal plate narrowed toward base, the arms stout and bluntly pointed, one erect, the other at right angles; third point small, sharp, directly opposite the lower arm. Basal hooks recurved, but short, not reaching middle of mesosomal plate. Ninth tergites rather large, rounded triangular pads, setose. All much as in *iolambdis* Dyar, but in that the upper mesosomal arm is short and dentate, and other differences in detail.

Larva. Head elliptical, wider than long, not widened at the eyes, infuscated with brown except on the margins; antennae long, notched beyond the middle, with a large tuft, the terminal third infuscated. Frontal spines very stout; long head hairs single, with a small two-haired tuft above and minute single hair within, tuft near antennae long and large, multiple, the structure normal for *Choeroporpa* (see Monograph plates 105 and 106, figs. 349, 351, 353, 354 and 355). Body pilose throughout, the pile weaker posteriorly. Comb of the eighth segment of many spines in a large patch. Air-tube about five times as long as wide at base, evenly tapering; pecten to one-third; six pairs of posterior hair-tufts, the basal one just within the end of the pecten and the longest and stoutest, feathered, the others progressively shorter; tube glabrous, the extreme base infuscated. Anal segment about as broad as long, ringed by the plate; ventral brush posterior; dorsal hairs a long single one, and another double one, of which one segment is long and stout and the other weaker. Anal gills longer than the segment, tapering.

Types, two females and one male, bred from a pool in a stream-bed that was nearly dry, Barranquilla, Colombia (L. H. Dunn). *Anopheles pseudopunctipennis* Theob. and *Culex coronator* D. & K. were associated.

TWO NEW MOSQUITOES FROM CALIFORNIA

(Diptera, Culicidae)

By HARRISON G. DYAR

Culex badgeri, new species.

Head with narrow curved golden brown scales of the usual type; a small patch of black scales on the side, below which the scales are flat and appressed, whitish brown; mesonotum with the scales fine and small, appearing sparse, shining golden brown as on the head, lighter than the dark brown integument. Abdomen black above, the segments dull yellowish toward their bases, forming a very indistinct paler banding; venter immaculate, light brown scaled. Legs black, femora pale beneath, tips of femora and tibiae indistinctly and narrowly light brown. Wing scales hair-like. In the male there are some white scales on the palpi beneath, chiefly at the bases of the last two joints and on the penultimate one; palpi above bronzy black.

Male hypopygium. Lobe of side piece bearing three rods, a leaf and a hooked filament, with a tubercle on the lateral aspect of the lobe. Clasper curved, concave beneath and with slightly winged margins, bearing a moderately long terminal spine. Mesosomal plate with the upper arm slender and tooth-like, the lower stout, thumb-shaped, seven long slender approximated teeth between; horn from the base exceeding the plate, flattened, twisted, with pointed tip. Tenth sternites tufted with spines, the outer spine triangular, but sharp and not dentiform; basal arm long, curved, its outer portion embrowned.

Types, male and female, Bakersfield, California, January 29, 1924, "Timber, between Catch Basin and River" (C. K. Badger). The specimens are obviously bred, associated with *Culiseta inornatus* Will. and *Culiseta maccrackenae* D. & K.

The formation of the lobe of the side piece in the male hypopygium in *Culex* proper consists of three rods, a leaf and a seta. The three rods and leaf are in line on the crest of the lobe, and the seta is inserted on the lateral aspect of the lobe below the leaf. This condition obtains in *nigripalpus* Theob., *stenolepis* D. & K., *lepostenis* Dyar, *chidesteri* Dyar and *virgultus* Theob., of the species that are before me. The develop-

ment is in the line of multiplication of the appendages of the lobe. The first step is represented by the addition of a small filament adjacent to the leaf, its tubercle lying approximate to the larger tubercle from which the leaf springs, and lateral thereto. Showing this general stage, the following species are before me: *secutor* Theob., *salinarius* Coq., *janitor* Theob., *erythrothorax* Dyar, *bonariensis* Brèthes (?=*dolosa* Lynch) and *federalis* Dyar. In *erythrothorax* and *janitor* the filament is simple and setaform; in *salinarius*, *bonariensis* and *secutor* it is hooked at tip and stouter; in *federalis* it is strongly hooked, and has migrated around the base of the leaf so as to lie beyond it, almost coming into line with the rods and leaf. In *badgeri*, here described, the filament is stout and rod-like, though strongly hooked, and lies nearly in line with the rods and leaf (as in *federalis*); but the seta on the side of the lobe has degenerated, leaving only its insertion tubercle to mark its site. By simply counting the appendages on the lobe, *badgeri* would fall in the *nigripalpus* group, whereas by considering the development, it is seen to belong to the *salinarius* group, and to be most nearly related to *federalis* of Mexico City.

Since writing the above, further material of this form has been received from Major Badger, and the second male mounted shows the seta present on the lobe of side piece and very strong. This brings the form still closer to *federalis*, of which it may be not more than a race. There still remains the difference in shape of the tooth of the mesosomal plate, which forms a strong shoulder in *federalis*, but less in *badgeri*.

***Aedes melanimon*, new species**

In general as in *Aedes dorsalis* Meig., especially the form *mediolincata* Ludl., except that the wing-scales are all dark or at least unicolorous, there being no contrasting dark and light veins as in *dorsalis*. Nevertheless, I considered this as a variety of *dorsalis* until a male was obtained. The very distinct hypopygium shows that a distinct species is represented.

Hypopygium. Apical lobe large, nearly bare, a few small setae on the inner face; basal lobe of side piece rounded, prominent, the inner area bare, the outer sparsely setose; a

long spine with curled tip and a shorter one, situated on the outer aspect of the lobe, the sparse setae following them and not more than about six in number except very minute ones. Claspette stem moderate, uniform, the filament longer than it, widely expanded and blade-like on the outer two-thirds. Ninth tergites small, rather long, with five small setae. Clasper slender, curved, with a long terminal spine.

Types, fifteen females, October, 1923, and two males, February 26, 1924, Bakersfield, California (C. K. Badger).

A NEW MOSQUITO FROM SIBERIA

(*Diptera, Culicidae*)

By HARRISON G. DYAR

Culex exilis, new species.

The specimens are much denuded; scales of mesonotum coarse, light brown; proboscis, palpi and legs dark, the palpi with whitish scales beneath at the bases of the last two joints; head scales more whitish than those of mesonotum; abdomen with basal whitish bands, but their extent cannot be made out. The colorational characters are indefinite, but the species is readily identified by the male hypopygium.

Lobe of side piece with three rods, two small filaments and a large one, a rather narrow leaf and a seta. Clasper curved, widened outwardly with expanded margins; terminal spine moderate. Tenth sternites densely spined on the inner side, the outer spines forming almost a single row, triangular, not tooth-like; basal arm long and curved, dark brown. First plate of mesosome thick, flattened, bent outwardly to project nearly at right angles, comparatively short; second plate with a thumb-shaped arm below, the upper angle slender and curving outward at right angles; third plate long, tooth-like, twisted distally and lined, ending in a sharp point.

Types, two males, Vladivostok, Siberia, July, 1923 (T. D. A. Cockerell).

The species belongs to the *pipiens* group. In Edwards' table of the Palaearctic mosquitoes (Bull. Ent. Res., xii, 330, 1921)

it falls with *perexiguus* Theobald (= *univittatus* Theob. according to Edwards, Bull. Ent. Res., xiii, 102, 1922) but this is said to be a very small species, whereas the present form is of the size of *pipiens*. The abdominal bands in *perexiguus* are white, while in the present form they seem to be yellowish. I have no male specimen of *perexiguus*, but Edwards states that the male hypopygium is as in *univittatus* Theob. I have a male of this from Lorenço Marques, in which the side piece lobe is quite differently shaped, and bears besides the rods, leaf and seta only a single long filament, exceeding the leaf.

MOSQUITOES FROM CHILE

(*Diptera, Culicidae*)

By HARRISON G DYAR

Some seventy-five years ago mosquitoes were apparently commonly received from Chile, and were described by the entomologists of the time; but no material has been received by any of the recent workers on the group. Consequently the old descriptions remain unidentified and the names cannot be applied. The fauna appears to be in large part endemic and peculiar, which makes exact knowledge all the more desirable.

***Culex flavipes* Macquart.**

Formerly referred to the synonymy of *Culex quinquefasciatus* or *Culex pipiens*; but Doctor Bonne having seen the type, pronounces it a small *Psorophora* or *Aedes*. (Ins. Ins. Mens., xii, 85, 1924.) Concerning the specific characters, nothing can be made out from the fragmentary type. Macquart says that the scales of thorax and wings are yellow, the legs pale yellow, proboscis brownish. The specimen was almost entirely denuded of scales at the time of description.

***Culex articularis* Philippi.**

Tarsi black, the femora and tibiae with white apices; thorax golden scaled. This suggests a *Culex* rather than an *Aedes*, but nothing is given that would determine a positive reference.

Culex marmoratus Philippi.

The description suggests a *Psorophora*. Legs pale grayish brown, the hind legs with long vestiture; abdomen marbled, and with white lateral spots.

Culex chilensis Blanchard (*variegatus* Blanchard, not Schrank).

Legs very pale, almost whitish; wings with scattered black spots, the three largest on the costa. Possibly a desert form of *Psorophora* or *Aedes*.

Culex serotinus Philippi.

Theobald (Mon. Culic., ii, 149, 1901) places this as a synonym of *flavipes* Macq., and redescribes what he takes to be *flavipes* from specimens of *Culex* from the Amazon region. Theobald's specimens were probably *Culex quinquefasciatus* Say, as he says they are found in large towns and are caught with the abdomen full of blood. There is nothing in Philippi's description to negative this reference, and it is quite probable that *serotinus* is a synonym of *quinquefasciatus*.

Culex vittatus Philippi.

Identified by Theobald with *Aedes albifasciatus* Macquart (Mon. Culic., ii, 40, 1901); but this species, which is not uncommon in Argentina, has the mesonotum golden scaled only on the sides, the central area being occupied by a paired dark brown band and dark brown again on the sides, or as Theobald describes it, "reddish brown, with a median yellow line and a broader line on each side." Philippi says: "Thorax without hairs, densely golden scaled." He described from two females, and it does not appear that they were rubbed. The abdomen has a median white line as in *albifasciatus*, but the Chilean form is very probably a different species from its Argentinian congener. The name is preoccupied by *Culex vittatus* Bigot (1861), which is also an *Aedes*, and consequently I suggest the name ***Aedes philippii*** for the species.

Culex annuliferus Blanchard.

Legs pale, black at the tips of the joints; abdomen testaceous,

the segments blackish posteriorly. This also would appear to be a desert form of *Psorophora* or *Aedes*.

Culex apicinus Philippi.

Thorax densely golden scaled; abdomen with (basal?) white rings; tips of femora and tibiae and all the tarsal joints (narrowly?) white. This would seem to represent an *Aedes*.

Anopheles annuliventris Blanchard.

Said by Knab (Am. Journ. Trop. Dis. & Prev. Med., i, 37, 1913) to be probably a male of *Culex* or *Aedes*. The legs are fuscus, the femora and second and third joints of the tarsi pale or whitish; abdomen dark with basal segmental whitish bands; wings infuscated, darker on the costa. This rather suggests *Psorophora*, which often have the wings infuscated.

Culex pictipennis Philippi.

Described from a male, and believed to be an *Anopheles*. Legs cinereus, the tarsi very long, the hind tarsi easily twice as long as the tibia, light brown, marked with a black circle in the middle, before which is a narrower white ring; apical part, beyond the black ring, all white.

A small series of mosquitoes from Chile has been in the National Museum for years, collected by Carlos E. Porter in 1912. The following species are represented:

Culex quinquefasciatus Say.

Ten specimens, of both sexes, Arica Chinchorra, June, 1912.

Aedes (Stegomyia) aegypti Linnaeus

Nine specimens, of both sexes, Taital, May, 1912, eight specimens; Arica Chinchorra, June, 1912, one male.

Aedes colonarius, new species.

Female. Proboscis black scaled with slight bronzy reflection; palpi and antennae missing; clypeus black, with white scales on either side; tori with small white scales; scales on vertex mostly narrow, white on the middle and behind, mixed there with erect black scales, an area of black scales centrally back

of each eye. Mesonotum blackish, bronzy brown scaled (denuded centrally); a narrow line of white scales laterally, from anterior margin to middle of mesonotum; pleura with scattered white scales; scales on scutellum and in antescutellar space white, the latter mixed with brown ones in front. Abdomen black scaled above, the segments with large triangular basal white patches, and some white scales on the posterior margins of the segments also; lateral basal triangular white spots, joining the white scaled venter; a series of large round medio-ventral black patches, resting on the posterior borders of the segments. Legs black, the femora white beneath, the tibiae with a white lateral line; all tarsal joints broadly white ringed at base. Wings iridescent, microtrichia present; scales on the veins black, appearing coarse and somewhat shaggy, but not forming spots; outstanding scales linear, all scales linear on the forks of second vein, but on other veins the appressed scales are ligulate to narrowly ovate. Size rather large, head to end of abdomen, 5 mm.

Type, female, Azapa Valley, Province Tacana, Chile, June, 1912 (C. E. Porter).

THE LARVA OF AEDES ALLENI TURNER

(*Diptera, Culicidae*)

By HARRISON G. DYAR

Head rounded, the antennae rather small, smooth, with a single hair at the middle; frontal hairs, upper single, long, lower in three or four, a pair of small multiple (about 10) tufts between, antennal tuft multiple (about 6), arranged as in *triseriatus* Say (Howard, Dyar and Knab, Mosq. No. & Cent. Am. & W. I., ii, Plate 74, 1912). Lateral abdominal hairs double after the third abdominal segment; short hairs in small stellate tufts (4 or 5). Lateral comb of the eighth segment of about 8 scales in a single row, the single scale stout with blunt tip, not fimbriate. Air-tube blackish, bluntly conical, the pecten fine and even, followed by a 3-haired tuft. Anal segment sub-triangular, the dark dorsal plate reaching two-thirds down the

sides. Anal gills large, the upper pair larger and longer than the lower pair. Ventral brush short, posterior, with two slight tufts preceding it.

Larvae from a hole in a willow tree, Mission, Texas (R. L. Turner).

THE LARVA OF AEDES THELCTER DYAR

(*Diptera, Culicidae*)

By HARRISON G. DYAR

At my suggestion, Mr. R. L. Turner has been on the outlook for this larva in the vicinity of Brownsville, Texas, and has now sent in what appears to be the long sought desideratum. Specimens were not isolated, but from a mixed culture adult *thelcter* emerged, and of the remaining larvae, the only form that cannot be identified with a previously known larva is supposed to be that of *thelcter*. The general structure agrees with that of the group to which *thelcter* belongs.

Head rounded triangular, wider than long, strongly infuscated on posterior border; antennae small, slender, a small hair at the middle. Frontal hairs single. Comb of the eighth segment of about 15 scales in a small patch nearly three rows deep in the middle; single scale with pointed tip. Air tube short, about two-and-a-half times as long as wide; pecten running far out, three-fourths of the tube or more, the terminal teeth rather weakly detached. Hair tuft small, but many haired, situated about the middle of the tube, well within the end of the pecten. Anal segment ringed by the plate, the tuft posterior; a dorsal tuft and long hair posteriorly. Lateral abdominal hairs single.

In the table (Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iv, 619, 1917), the larva falls with *bimaculatus*, from which it differs in the shorter tube, pecten running further out, weaker tuft, pointed instead of feathered and fewer scales of the lateral comb and other details.

SOME INSECTS FROM THE CHILIBRILLO BAT CAVES OF PANAMA

By A. N. CAUDELL

In late August of last year R. C. Shannon, J. Zetek, and I. Molino paid a brief visit to the little known bat caves of Chilibrillo, situated in limestone formation located about a mile from the Rio Chilibrillo in Panama. Interesting data on the location and formation of these caves will be found in Proc. U. S. Nat. Mus., vol. xlii, p. 21-23, 1912, by Mr. A. Busck. The collectors have submitted the Orthoptera taken in these caves to the writer for determination, and also furnished the list of insects of other orders as appended to this report.

The crickets were collected in the ante-gallery of the caves, through which flows a stream with clean, bare dirt banks. The crickets were resting on the walls. At the rear of this gallery is another chamber with a foot or so of bat guano covering the floor. Under rocks resting on this guano covered floor were found the various forms of roaches, the largest of which were also found resting on the walls of the chamber. Earwigs were also collected beneath these stones.

The orthoptera collected in the caves are considered as of sufficient interest to deserve being recorded, though no new species are found among their number. The male of a roach which was before known only from the female sex is noted and parts of the genitalia figured.

ORTHOPTERA

FORFICULIDAE

Psalis americana Beauv.

Three adult male specimens of this earwig were taken, together with a single nymph of the same sex. They were collected beneath rocks on the guano covered floor of the second chamber of the cave.

BLATTIDAE

Xestoblatta immaculata Hebard.

Two males, two females and a single immature individual of

this roach were in the collection. The male, up to the present time unknown, is very like the female in general structure and appearance. The eyes are closer together than in the female, at the narrowest point being barely equal to the greatest width of an eye.

The subgenital plate of the male is somewhat asymmetrical; the left style is a simple organ scarcely longer than broad and bearing several hairs, the apical ones fully as long as the style itself; the right style is very different from the left one, being an irregularly cylindrical organ about four times as long as broad, apically furnished with four sharp chitinous teeth, the apical one the stoutest, and basally on the outer side with a very long stout spine, over one-half as long as the style itself; this spine is not ordinarily visible as it is normally concealed beneath the subgenital plate. Plate IV, fig. A shows the cerci with the basal spine of the right one exposed. The internal genital organs are well chitinized and appear rather characteristic for the species; the two main organs are the right and left genital hooks, the right one forming a long sharp simple thorn with a swollen and mostly membranous base on which are borne several stout brown bristles; the left hook rises from a swollen membranous base and is itself sub-cylindrical, fully chitinized and forms a recurved hook, the apex somewhat twisted, a little swollen and fissate, the smaller section forming a sharp compressed tooth, lying so closely pressed to the larger section as to easily escape notice unless examined under rather strong magnification; this hook is shown in Plate IV, figure B. The above organs normally lie concealed for the greater part among surrounding tissue.

The nymph above recorded shows that the broad buffy colored variegation of the tarsi, as described in the original characterization and present in paratypic nymphs, is not constant, being absent in the present specimen. This specimen was, however, apparently taken when on the verge of shedding, as parts of the integument seems to be partly separated from the underlying portions; this may affect temporarily some of the colorational characters.

Blaberus giganteus Linn.

Two adult males and several nymphs of this roach were taken under rocks in the second chamber of the cave, and also on the walls. They were easily picked up and acted as though unable to see; they were not frightened by flash-lights and even when touched they would not run far.

GRYLLIDAE

Hapithus montanus Sauss.

A single adult male is referred here with some doubt. The species was described from the female sex only and the male has never been described. The present specimen is very like a rather small and slender specimen of *Hapithus agitator*.

Arachnomimus cavicola Sauss.

A single male specimen is referred here as it appears to agree fairly well with what an adult male of this little known insect might be expected to be. The tegmina are represented by mere rounded, veinless, scale-like pads. The anterior tibiae are without hearing organs, a character of little value, however, owing to an extraordinary variation in this respect among the genera of the subfamily Oecanthinae. The general color of this specimen is dark brown, the legs somewhat lighter and the antennae with several widely separated bands of a lighter color. The femora are very long and slender, the posterior ones with a longitudinal whitish stripe on the outer face bordered below by black.

Measurements—Length, pronotum, 2.5 mm.; anterior femora, 12 mm.; posterior femora, 18 mm.; tegmina, 1 mm.

Endacustes sp.

A single adult male, a smaller and more unicolorously brown form than the Peruvian species described by the present writer as *E. maculata*. It is not thought advisable to describe this form as a new species as the systematics of the group to which it belongs is now in such an unsatisfactory condition.

INSECTS OTHER THAN ORTHOPTERA

The list of insects here given represents the species collected by Zetek, Molino and Shannon.

In 1912 Mr. August Busck made a collection of insects in these caves. Most of his material is duplicated by ours; however he reared a species of *Drosophila* from the bat guano and this is added.

Collembola (Determined by J. W. Folsom).

Cyphoderus inaequalis Ms

Lepidocyrtus usitatus Ms

Schöttella caeca Ms

These species occur in numbers in the bat guano.

Hemiptera (det. by W. L. MacAtee).

Amnestus uhleri Distant (Cydnidae). Numerous in the guano. All but egg stage obtained. This species was collected by Schwarz and Barber "in cave earth" at Cacao, Trece Aguas. Guatemala, April 3, 1906, as well as *Pangoeus piceatus* Stal. (W. L. M.)

Triatoma (Cornohinus) geniculata Latr. Several nymphs and adults on walls of cave. Probably attracted by the bats on which they may feed.

Lepidoptera: *Timea* sp. (A. Busck).

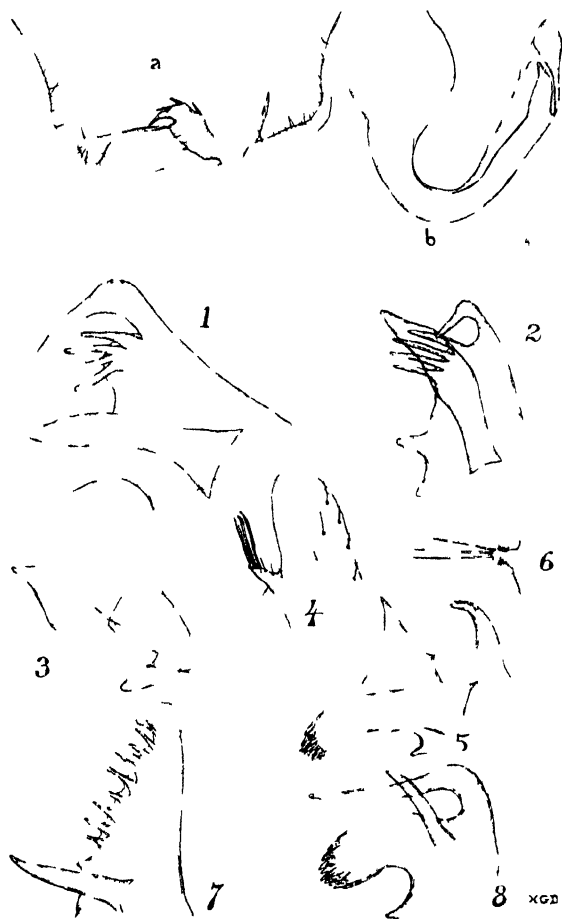
Diptera

Drosophilidae (Det. J. R. Malloch): *Drosophila funebris* Fallen. Reared from bat guano by A. Busck.

Streblidae (determined by Quinta C. Kessel). These species were collected on bats, of *Chulonycteris rubiginosa rubiginosa* (det. G. Miller).

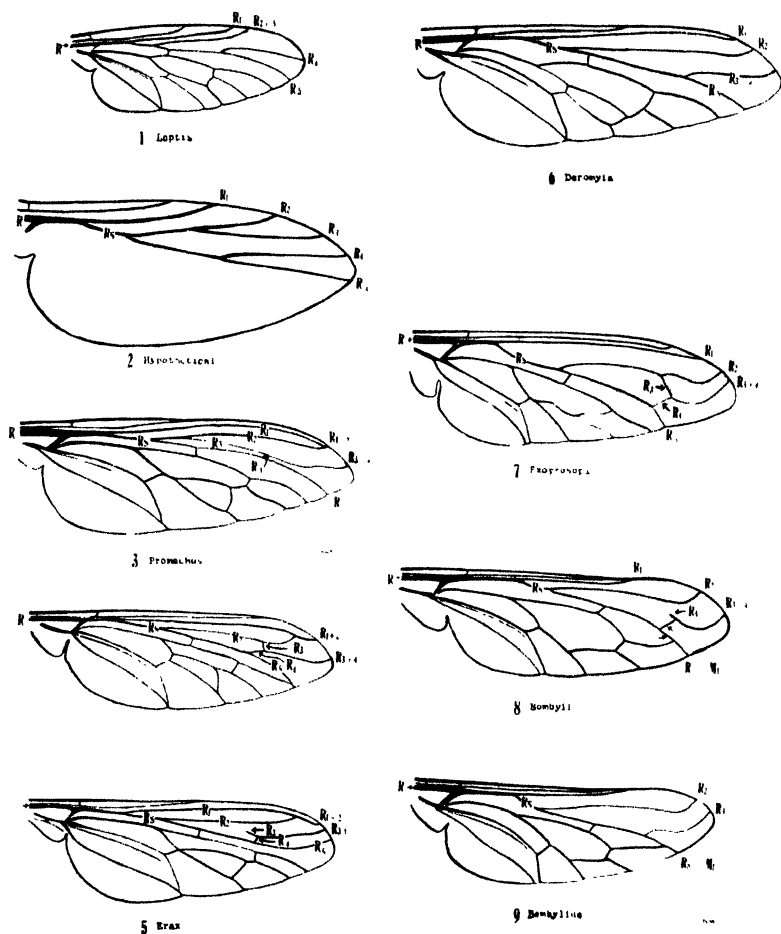
Nycterophila coxata Ferris, one specimen.

Trichobius caecus Edwards, numerous specimens.



EXPLANATION OF PLATE IV

- A *Aestoblatia immaculata* Hebard styles of male
- B The same left genital hook of male
- 1 Mesosomal plate of male of *Culex coronator* Dyar & Knab
- 2 The same *Culex surinamensis* Dyar
- 3 The same *Culex agilis* Dyar
- 4 Lobe of side piece male *Culex agilis*
- 5 Mesosomal plate of male of *Culex duplicator* Dyar & Knab
- 6 Lobe of side piece male *Culex duplicator*
- 7 Mesosomal plate of male of *Culex brevispinosus* Bonne Webster & Bonne
- 8 The same *Culex bonneti* Dyar & Knab



EXPLANATION OF PLATE V

Fig. 1. Wing of *Leptis* (after Comstock).

Fig. 2. Radius of hypothetical ancestral type of the Brachycera.

Fig. 3. Wing of *Promachus rufipes* Fab.

Fig. 4. Wing of *Pogonosoma dorsata* Say.

Fig. 5. Wing of *Erax rufibarbis* Macq.

Fig. 6. Wing of *Deromyia umbrina* Loew.

Fig. 7. Wing of *Exoprosopa*.

Fig. 8. Wing of ♀ *Bombylius major* L.

Fig. 9. Wing of *Bombylius pygmaeus* Fab.

RADIAL VENATION IN THE BRACHYCERA

(Diptera)

By RAYMOND C. SHANNON AND S W BROMLEY

It seems remarkable, in view of the careful work that has been done in recent years on the venation of Diptera, that the significance of the stump vein (labeled R_3 in Plate V, Figs. 5 and 8) leading back from the base of R_4 in many of the Brachycera has been overlooked. This condition is quite common, particularly in the Asilidae and Tabanidae, two families exhibiting a comparatively primitive venation. This spur has been referred to as a secondary development, but that it is part of the atrophied vein R_3 seems more probable in view of the evidence at hand.

Commonly in the Brachycera, the *radius* is composed of R_1 , and the radial sector (R_s) with three successive branches designated by Comstock, R_2+3 , R_4 , and R_5 . This condition may be illustrated by the wing of *Leptis* (Plate V, Fig. 1)

That the *radius* is more generalized, however, in certain Asilidae, Tabanidae, and Bombyliidae, is apparent when we consider that here we have evidence of all four branches of the primitive radial sector

A hypothetical type of primitive Brachycerous wing might be illustrated as in Plate V, Fig. 2, where all five branches of the radius are apparent and as yet no fusion has taken place.

From a consideration of the radius of a number of forms of Asilidae, Bombyliidae and others, treated below, it appears that instead of R_2 and R_3 uniting, there has been a coalescence of R_3 and R_4 , while R_2 persists as a single vein, or in some cases (Mydidae, Apioceridae, and certain species of Laphriinae and Asilinae of Asilidae) unites near the tip with R_1 . The basal part of R_3 (that from R_2 to the coalescence with R_4), however, has atrophied and in most cases is completely lost, although it still exists as a stump vein in such forms as *Erax* (Asilidae), and *Tabanus* (some), *Pangonia* (some), and *Haematopota* (Tabanidae), most of the Mydidae, etc. In the Bombyliidae, it persists in a great many cases but has taken

on the appearance of a cross vein and has been designated as an "accessory cross-vein" by Comstock and Needham.

A very good gradation from a complete R_3 with its union with R_4 to a complete loss of the basal part of R_3 leaving only the apparent " R_4 " as a normal fork of the petiole R_4+5 is found in the family Asilidae.

In the Asilinae there are several genera (*Promachus*, *Mallophora*, *Alcimus*, *Philodicus*, and *Erax*) and in the Laphriinae, one (*Pogonosoma*) in which R_3 is complete, running from R_2 to R_4 (Plate V, Figs. 3 and 4).

Plate V, Figure 5 is a common type of *Erax* wing in which the basal part of R_3 is absent leaving the stump-vein with which R_4 has fused.

This condition occurs quite frequently throughout the Brachycera, being found in the Asilidae, in *Erax*, *Phellus*, *Acenphalum*, *Obelophorus*, *Laxenecera* (some), *Neophoneus*, *Apoclea*, *Proctacanthus* (some); many of the Mydidae; in *Haematopota*, *Pangonia* and a few species of *Tabanus* in the Tabanidae; in a few species of *Chrysopila* (Leptidae); and occasionally in *Thereva* (Therevidae).

In a specimen of *Proctacanthus rufus* Will. examined, the stump vein was quite well developed, although as a rule this species has the spur restricted to a minute knob at the angle of the vein, or entirely wanting.

Plate V, figure 6 represents the type of venation found in the majority of the species of the Asilidae and the rest of the Brachycera in which the basal part of R_3 is completely lost and the vein appears to be R_4 . This condition is found in *Erax*, also.

It may be seen that *Erax* is included in each set of conditions and we do find all these gradations in this genus. *E. anomalus* Bigot and *E. candidus* Coq. have R_3 complete as in Figure 3; most of them have the distinct angle with the spur running basad as in Figure 5; while *E. latrunculus* Will. exhibits the condition shown in Figure 6. This difference in venation shows that *Erax* has strong relationships with both *Asilus* and *Promachus*.

A point worthy of note is the fact that in many cases there is a distinct angle in the vein at the juncture of R_3+4 although the base of R_3 is entirely gone, and there is often a minute knob at this point as in some *Tabanus*, *Proctacanthus*, *Coenomyia*, etc., showing the derivation of this vein as a product of the fusion of the two veins before it has taken over entirely the character of a single vein.

With the Bombyliidae the gradations are also well shown, although conditions differ slightly from those in the Asilidae. In the former, the branches of the radius have taken more of an upward turn, although probably in all cases the union of R_3 and R_4 has been due to the upward migration of R_4 , as this direction of migration seems to be the usual tendency in the Brachycera, in fact in all Diptera. In the Bombyliidae the number of genera which have R_3 present is about equal to the number which have it atrophied. Some, e.g. *Systropus*, have the radius very similar to *Leptis*, etc.; others, *Phthiria*, etc., have the stump-vein present; while *Exoprosopa*, *Pantarbes*, etc., show a condition similar to *Pogonosoma* (Plate V, fig. 4) of the Asilidae. Perhaps these similarities tend to show that if R_3 is present in one group it is present in the others.

R_3 complete is illustrated by *Exoprosopa*, *Pantarbes*, *Lordotus*, *Anthrax*, etc. (Fig. 7).

The spur condition is shown in *Phthiria*, *Bombylius* (occasionally), and *Anthrax* (Fig. 8).

The single vein R_3+4 is shown in *Sparnopolius*, *Anthrax*, *Bombylius*, and *Systropus* (Fig. 9).

All gradations are found in *Anthrax*, as in *Erax*. In his "Dipteres Exotiques," Vol. II, part 1, Pl. 20 and 21, Macquart figures all gradations in this genus.

In all of these forms there is absolutely no indication shown of a fusion of R_3 with R_2 , but on the contrary there is very good evidence of a fusion of R_3 and R_4 . The foregoing interpretations eliminate the idea of an accessory cross vein between " R_2+3 " and " R_4 " in the Bombyliidae. They indicate further that the Nematocera and Brachycera have a common line of descent, instead of different ones as is supposed by

Comstock in discussing the reduction of the radial sector in the wings of Diptera, in "Wings of Insects" (pp. 351 and 352), where it is stated: "Not only do we find differences in degree of reduction of this vein, but differences in the method of reduction are also shown. If the wing of *Leptis* and of *Dixa* be compared, it will be seen that although in each the radial sector is only three-branched, the reduction has been brought about in a different way in the two genera. In *Leptis*, veins R_2 and R_3 coalesce; while in *Dixa* it is veins R_4 and R_5 that have grown together. This is a difference in kind of specialization, which indicates that the two forms (they represent the two suborders, Brachycera and Nemato-cera, respectively) "belong to different lines of descent."

The new interpretation, however, shows that the Nemato-cera and Brachycera are related at least more closely than is intimated above. A difference still separating them would be the fact that in *Dixa* R_4 is fused with R_5 but in *Leptis* R_4 is fused with R_3 .

In comparing the two suborders, however, a more generalized type of venation should be chosen than *Leptis*. The sub-order Brachycera may be divided into two groups; one group, in which the costa runs clear around the margin of the wing, includes the Bombyliidae, Asilidae, Mydidae (in some forms this is faint on posterior margin), Apioceridae, Therevidae, Scenopinidae, Tabanidae and Leptidae; the second, in which the costa runs only part way, includes *Xylomyia* (*Subula*), the Stratiomyidae, Acanthomeridae, Nemestrinidae, and Cyrtidae. The remaining two families not included above, the Empididae and Dolichopodidae, should form a group apart from the others. Considering the first group at least, it would appear that a more generalized type of venation in respect to the radius at least, is to be found in the Asilidae and Bombyliidae than in the Leptidae in view of the fact that traces of all five branches of the primitive radius are present in these families.

TWO UNDESCRIBED SPECIES OF TANYDERUS FROM THE AUSTRALASIAN REGION

(Diptera, Tanyderidae)

By CHARLES P. ALEXANDER

The two new species of *Tanyderus* discussed herein both belong to the subgenus *Radinoderus* Handlirsch, a division of the genus that includes the Chilean *Tanyderus gloriosus* Alexander and the three previously described Australasian species keyed below. The subgenus *Radinoderus* was erected by Handlirsch in 1909 (Ann. Naturhist. Hofmus. Wien, 23, 264) to receive the single species, *ornatissimus* (Doleschall). The Australasian species of the subgenus may be keyed as follows:

1. Legs, including the tarsi, yellow, the knees brown to black..... 2
 Legs brown to brownish black, the femoral bases paler..... 4
 2. Wing-pattern in part ocelliform, this including a conspicuous ring
 with the fork of $R_2 + 3$ as a center (New Guinea),
oculatus Riedel
 Wing-pattern not ocelliform..... 3
 3. Antennae 22-segmented (Amboina, Obi)...*ornatissimus* (Doleschall)
 Antennae 24-segmented (South Queensland),
terra-reginae, new species
 4. Mesonotum with three brown stripes, the pleura not dusted with gray;
 no pale ring on fore tibia (Solomon Islands),
solomonis, new species
 Mesonotum with four ill-defined brown stripes, the pleura dusted
 with grayish white; an ill-defined pale ring on the fore tibia
 (New Guinea).....*mirabilis* de Meijere

Tanyderus (Radinoderus) terræ-reginæ, new species.

Sex?—Length (excluding genitalia) about 24 mm.; wing 18.5 mm.

Rostrum and palpi black. Antennal scape black, the flagellum conspicuously light yellow throughout; antennae 24-segmented, the basal flagellar segments short-cylindrical, gradually increasing in length, the terminal segment about one-third the length of the penultimate and slender. Eyes practically contiguous above, the vertex being reduced to a capillary strip that is a little wider behind, light gray, the posterior vertex with a median brown line.

Cervical sclerites elongate, about as long as the head, dark brown. Pronotum dark brown medially, paler laterally. Mesonotum pale brown, with three darker brown stripes, the interspaces passing into gray behind, the transverse suture indicated laterally; scutellum yellow, the caudal margin and a median line dark brown; postnotum brown, the cephalic-lateral angles yellowish. Pleura dark brown, with a large pale area that includes portions of the anepisternum, sternopleurite and the cephalic margin of the pteropleurite. Halteres yellow, the knobs dark brown. Legs with the coxae infuscated, the trochanters brighter brown; femora bright yellow with the tips broadly and conspicuously blackened, the tibiae likewise yellow, the bases blackened, the amount equal to the femoral apices; tips of the tibiae barely darkened; tarsi yellow. Wings whitish subhyaline, with a handsome brown cross-banded pattern as in the genus; the band along the cord very oblique, Y-shaped, the subterminal band along the level of the outer end of cell *1st M*₂ being more transverse, the white band lying between narrow at cephalic end, widening posteriorly, the whole outer end of cell *Cu*₁ virtually devoid of dark markings except the extreme distal corner; basal brown band heavy, connecting with the band at the cord only by a narrow seam along vein *Cu*; band along cord and subterminal band connected with one another only in cell *R*₁; apical band solid, connected with the subterminal band in cells *R*₄ and *R*₅. Venation: cell *1st M*₂ elongate, about twice the length of vein *M*₃ beyond it; *m-cu* present; branches of *Cu* widely divergent, cell *Cu*₁ at margin being fully four times as wide as cell *M*₄.

Abdominal tergites dark brown, each segment with an oval whitish mark on either side; sternites dark brown, sparsely variegated with small yellowish areas. Genital segment broken

Habitat.—South Queensland.

Holotype, Sex?—Brisbane, the type bearing the label "10-10, J. A. K.," possibly collected by Kutsche.

Type in the collection of the National Museum, Melbourne, Victoria.

Tanyderus (Radinoderus) solomonis, new species.

Female.—Length about 14 mm.; wing 12 mm.

Closely related to *T. (R.) mirabilis* de Meijere (New Guinea), differing as follows:

Size smaller. Vertex between the eyes reduced to a capillary strip. Mesonotal praescutum and scutum with only three dark brown stripes, the median stripe quite undivided; scutellum greyish yellow, the caudal margin narrowly dark brown. Pleura brown, sparsely variegated with paler, not pruinose. Legs brown, the femoral bases broadly yellowish; no evident pale ring on fore tibia. Abdominal sternites with whitish comma-shaped marks, almost as on tergites.

Habitat.—Solomon Islands.

Holotype, ♀, Guadalcanar Island, January 17–18, 1921 (J. A. Kutsche).

Type in the collection of the Bishop Museum, Honolulu.

ANOTHER NEW CULEX FROM PANAMA

(*Diptera, Culicidae*)

By HARRISON G. DYAR AND RAYMOND C. SHANNON

Culex (Melanoconion) ruffinis, new species.

Palpi of male exceeding the proboscis by nearly the length of the last joint; wing scales ovate on the forks of the second vein; palpi, proboscis and tarsi dark; small white spots at ends of femora; head with narrow scales widely at the vertex, flat whitish ones on the sides; abdomen with broad basal segmental white bands.

Male hypopygium. Basal excavation reaching two-thirds the length; at its tip, two rods (on one side three) one inserted basad of the other represent the inner division of the lobe of side piece; outer division a slender column with a filament inserted near the middle of the shaft and four fine setae at the rounded tip. Tenth sternites comb-shaped, slender with about ten teeth; ninth tergites conical, pointed, finely setose on the outer half; mesosome of two diverging pointed cones; articulated plates large and brown.

Type, male, captured, Barro Colorado Island, Gatun Lake, Canal Zone, July 9, 1923 (R. C. Shannon).

Near *zeteci* Dyar. In this, however, in the male hypopygium, the mesosomal cones are proportionately much larger, the inner division of the lobe of side-piece is darkly colored, while the columnar outer division bears a distinct leaf.

THE LARVA OF *CULISETA MACCRACKENAE* DYAR & KNAB

(*Diptera, Culicidae*)

By HARRISON G. DYAR

Several attempts have been made to find this larva, but without success, until I applied to the original collector, Miss Isabel McCracken. She says: "The larvae sent herewith I gathered for class-room work; but when the first mosquito that emerged proved to be *maccrackenae* I rescued the material for you. I found them in a tub of water in which cactus-leaves were being macerated. The water in this tub has been undisturbed for weeks, and is stagnant and very slimy. Mosquito-collecting around the University is becoming difficult owing to the energy of the 'Mosquito Abatement Officer.'"

Larva. Head rounded, a little wider than long, the antennae short, not exceeding the mouth-brushes. Upper head tuft in 7; lower of two stout hairs and a small one, but the tuft is not longer than the upper tuft, shorter rather. The tubercles are small; as in *incidens* but weaker. Lateral comb of the eighth segment of many spines in a patch. Air-tube about three times as long as wide, tapered at tip; pecten teeth elongate and hair-like outwardly, even the basal ones being fine and long, with two teeth at the base; hairs running out about three-fourths of the tube, the distal ones more sparsely spaced. Anal segment ringed by the plate, the two anterior detached tufts of the ventral brush are in a narrow notch in the chitin, not enclosed and puncturing it as in the other *Culiseta* species. Anal gills four, not longer than the segment.

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NOTES ON NORTH AMERICAN TACHINIDAE

By J. M. ALDRICH

The following items of synonymy, etc., have accumulated in the course of work on the Muscoid collections of the National Museum:

Neotrafoia Townsend.

Neotrafoia Townsend, Proc U S N. M., vol. 43, 1912, 313. Type, *incarum* Townsend.

Charapemyia Townsend, *ibid*, vol. 56, 1919, 589. Type, *calida* Townsend.

Townsend in 1912 had only the female, from Cuzco, Peru; in 1919 he included only males, from Rio Charape, Peru. His Peruvian material in the National Museum contained three additional males from Uruhuasi, Peru. The Museum also contains a set of two males and four females, collected by Townsend many years ago in the White Mountains of New Mexico (South Fork Eagle Creek, August 18 and 21, and North Fork Rio Ruidoso, August 17), which he overlooked when describing both genera. This set shows clearly that *calida* is the male of *incarum*. There is one sexual difference which misled Townsend: the ocellar bristles of the female are of remarkable size, erect, divergent and gradually reclinate; while in the male they are proclinate and parallel, and not quite so large. There is no disagreement in the other characters.

The species was identified by Coquillett as *Exorista hispida* Van der Wulp, one of the White Mountains specimens still bearing his label. This I think a misidentification—at least the genus *Neotrafoia* is a very distinct one. The species has

densely hairy eyes; two large verticals in both sexes; frontals few and large, the lowest at level of arista; parafacials bare; third antennal joint rather wide, especially toward apex; a large pteropleural; scutellum with several erect, tall, straight, bristly hairs; no acrostichals immediately in front of the suture.

Lixophaga Townsend.

Lixophaga Townsend, Muscoid Flies, 1908, 86 (Smiths. Misc. Colls., No. 1803); Jour. N. Y. Ent. Soc., xxi, 1913, 303. Type, *Lixophaga parva* n. sp. = *Hypostena variabilis* Coquillett.

Euzenillia Townsend, Jour. N. Y. Ent. Soc., xx, 1912, 111; Ins. Ins. Mens., iii, 1915, 121; iv, 1916, 31. Type, *Euzenillia aurea* n. sp. = *Hypostena variabilis* Coquillett.

Euzemilliopsis Townsend, Ins. Ins. Mens., iv, 1916, 76. Type, *Euzemilliopsis diatraeae* n. sp.

Townsend named the genus *Euzenillia* from a slide of female reproductive organs and eggs, while he was in Peru; the adult from which these came he later searched out in the National Museum, after he returned, and discovered it to be Coquillett's *Hypostena variabilis*. He associated this female with a male of another species, having orbital bristles, when he finally came to give the adult characters of *Euzenillia* (1916, p. 31).

Coquillett described *variabilis* from female specimens collected at Algonquin, Illinois, by Dr. W. A. Nason. While I was living at Lafayette, Indiana, I found the species fairly common and obtained a series of both sexes. The male has a narrow front and no orbitals, just as the type of *Lixophaga parva*, but averages larger than that type.

Phaenopsis Townsend.

Phaenopsis Townsend, Proc. U. S. N. M., 43, 1912, 362. Type, *arabella* new species, from Sullana, Peru.

Dimasicera Townsend, Jour. N. Y. Ent. Soc., xxiii, 1915, 62. Type, *nitida* new species, from Sullana, Peru.

Besides the type specimens there are several others in the National Museum from Townsend's Peruvian material; some of them have the abdomen entirely shining, but do not differ otherwise. A male specimen from College Station, Texas, sent

in by Mr. H. J. Reinhard, shows that the species must be counted among the North American; it seems strictly typical. Townsend's second description is very full and needs no additions.

Oxynops Townsend.

Oxynops Townsend, Jour. N. Y. Ent. Soc., xx, 1912, 110. Type, *scrratus* new species = *Hypostena nitens* Coquillett. Synonymy by Townsend, Ins. Ins. Mens., iii, 1915, 119.

Euchaetophleps Townsend, Proc. U. S. N. M., vol. 49, 1916, 625. Type, *Chaetophleps polita* Coquillett.

This is a case where Coquillett described the same species twice. The type of *polita* has two small hairs on the first vein near its tip in one wing, and three in the other; the type of *nitens* has one of the same hairs in one wing, none in the other. Thirty-one additional specimens in the National Museum, ranging in locality from Lima, Peru, to Mandan, North Dakota, with intermediate specimens from Mexico (Yucatan and Tabasco), Texas, Florida, etc., show that these hairs are not of specific importance. In most they are absent, but in one case there are three in one wing and none in the other; and in a specimen labeled *Oxynops nitens* by Townsend himself, there are two in one wing, one in the other. Discal bristles are generally present, but often weak and sometimes absent on third segment.

Tachinophyto Townsend.

Tachinophyto Townsend, Trans. Amer. Ent. Soc., xviii, 1892, 130.

Type, *Tachinophyto floridensis* new species.

Pseudomyothyria Townsend, ibid., p. 131. Type, *Pseudomyothyria indecisa* new species.

Few North American Tachinidae have been more frequently misidentified than *Tachinophyto floridensis*. There is a single female type in the University of Kansas, and in the National Museum there is a male marked type. Both are labeled "S. Fla. Robertson." Mr. Robertson writes me that the latter is not a type, but that he sent it to Coquillett after the publication of the species. It is, however, one of a set of four including

the type which are all that Mr. Robertson ever obtained. I have not seen the other two. I have had the two indicated types together and compared them closely, and have no doubt that they are the same species. The National Museum has two additional females—one from San Rafael, Vera Cruz (Townsend), the other from Alajuelo, Panama (Busck).

Front of male very wide, at vertex 0.34 of the headwidth, still wider forward, with two orbitals as in the female; outer vertical small but distinct; frontals about 7, the upper two reclinate, the second large; lowest at level of tip of second antennal joint; parafrontal and parafacial silvery, the posterior orbit also silvery; bucca one-fifth of eye height; second antennal joint a little elongated, the third long and slender, almost three times the second; arista thickened on basal fourth, penultimate joint short; vibrissae at oral margin, not approximated, four or five good-sized bristles above them, ascending not quite to middle of third antennal joint. The face is receding, so that the length at antennae compared with that at vibrissae is as 16 to 10. The main characters of thoracic chaetotaxy are: presutural 2; supraalar 2, the anterior very large (in the female a small third bristle before this); sternopleural 1, 1; pteropleural one rather distinct; acrostichal and dorsocentral both 2, 3. Abdomen mostly shining, a narrow silver border at anterior edge of segments 2, 3 and 4, which is very slightly interrupted in the middle; no discals. The third and fourth tergites on the ventral ends have each an oval area of very delicate fine pile in the male, not easily perceived but no doubt of specific importance.

In the female the front is narrower than in the male, being only 0.24 in the type and 0.31 in the Vera Cruz specimen. The difference lies in the wider parafrontals and parafacials of the male.

In both sexes the first posterior cell opens almost in the apex, and the fourth vein has a rounded bend and is concave beyond; in the female, however, the bend is less oblique and the concavity greater than in the male, the apical part of the

wing being broad and short. The costal spine is strong in both sexes, and the third vein has only 2-4 hairs at base.

No piercer is present in the female, as I ascertained by dissection of the Vera Cruz specimen after comparing it with the type. Some confusion has arisen on the point, as Townsend when he gave the characters in *Insecutor* Ins. Menst., IV, 1916, 32, had the wrong female, his specimen being a small *Doryphorophaga*, as shown both by the piercer and by the dense group of curved spines on the middle coxa (this character is noted by Aldrich and Webber, Proc. U. S. N. M., 63, art. 17, p. 10, footnote). On this page Townsend is comparing *Lixophaga variabilis* and *Tachinophyto floridensis*, but has the wrong male of the former and the wrong female of the latter, a very curious circumstance.

Eumyothyria indecisa Townsend is represented in the University of Kansas by the single type, a female; it is from Carlinville, Illinois (Robertson). I examined it on several visits to Kansas (1901, 1914, 1917). I readily matched it with specimens from Lafayette, Indiana, where the species is common. The principal difference from *floridensis* that was brought out by Townsend was the presence of discal bristles on the second and third abdominal segments. These are smaller than the marginals in the type, and in my series are quite variable, in several cases being present on one segment and absent on the other, or even absent on both. Evidently they are not of specific importance.

The species differs from *floridensis* in having a small third sternopleural, the facial ridges a little more bristly, parafacials and parafrontals narrower in the male, costal spine absent, pollinose bands of the abdomen broader and more diffused, and the fourth vein with a broader, more oblique curve, beyond which it is nearly straight. The male has orbitals like the female. Besides 27 Lafayette specimens the Museum has seven from Attica, Indiana, October 7, 1916; and one from Great Falls, Virginia, August 9, 1923, all collected by me.

NEW SPECIES OF JAPANESE CRANE-FLIES— PART IV

(*Diptera*, *Tipulidae*)

By CHARLES P. ALEXANDER

The new species of *Tipulidae* described at this time consist of species of *Limonia* taken in Hokkaido and Honshiu by Messrs. Esaki and Kuwayama, and an interesting species of *Limnophila* from the Loochoos, taken by Mr. Sakaguchi. My deep thanks are extended to the collectors of this material for the privilege of retaining the type specimens.

Limonia pallidipleura, new species.

General coloration reddish brown; praescutum with four narrow black stripes; pleura pale; femora yellow, each with two dark brown rings; wings tinged with yellow, the stigma ring-like; no dark markings at arculus; Sc_1 ending beyond the fork of R_s .

Female.—Length about 11 mm.; wing, 12–12.2 mm.

Rostrum and palpi black. Antennae with the basal segment obscure yellow; second segment and basal segment of flagellum obscure brownish yellow; remainder of the flagellum dark brown, in the paratype the extreme bases paler. Head dark brown, pruinose, especially anteriorly.

Pronotum dark brown. Mesonotal praescutum reddish brown with four narrow black stripes, the intermediate pair separated by a pale line that is a little wider than the stripes; lateral margin of praescutum behind pseudosutural foveae narrowly blackened; lateral stripes crossing the suture and suffusing each scutal lobe, the posterior lateral region pale; median area broadly yellow, continued caudad onto the scutellum which is silvery pollinose, the lateral margins of the scutellum black; postnotum with the mediotergite pale, the cephalic lateral portions blackened. Pleura pale reddish brown, sparsely pruinose, the color including the postnotal pleurotergite. Halteres pale, the knots more infuscated, the extreme base yellowish. Legs with the coxae reddish; trochanters obscure yellow; femora

brownish yellow, the tips narrowly brownish black, preceded by a very narrow paler brown annulus. Wings tinged with yellow, the base and costal region more suffused; stigma circular, brown, enclosing a large area of the ground-color, r at the extreme outer end of the ring; small brown clouds at origin of R_s , along the cord, including a large blotch at the fork of R_s , connected with the stigmal ring; a narrow seam along the outer end of cell 1st M_2 ; faint brown seams along the outer longitudinal veins, more evident on veins Cu , 1st A and 2nd A ; no brown marking at arculus; veins dark brown, paler in the flavous areas. Venation: Sc long, Sc_1 ending beyond the fork of R_s , Sc_2 about its length from the tip; R_s long, arcuated at origin; r at extreme tip of R_1 ; basal deflection of Cu_1 before the fork of M .

Abdomen with the tergites dark brown, the lateral margins obscure brownish yellow, the color more extensive on the posterior segments where the brown is reduced to triangular markings; sternites obscure yellow. Ovipositor with the tergal valves dark castaneous, slender and small; sternal valves very deep and with the tips obtuse.

Habitat.—Japan (Honshiu). *Holotype*, ♀, Hinoëmata, Iwa-shiro-no-kuni, altitude 3280–6235 feet, July 24, 1923 (T. Esaki). *Paratopotype*, ♀.

***Limonia pullata*, new species.**

(General coloration black, the abdomen obscure brownish yellow; antennal flagellum largely yellow; femora yellow, each with two black rings; wings light yellow with a sparse brown pattern; Sc_1 ending opposite midlength of R_s .)

Female.—Length about 10 mm.; wing, 11 mm.

Rostrum and palpi brownish black. Antennae with the first scapal segment black, the second brownish yellow; flagellum light yellow, the intermediate segments narrowly and indistinctly infuscated basally, the amount increasing still more on the terminal segments. Head black.

Pronotum black. Mesonotal praescutum obscure brownish yellow, sub-shiny, with three black stripes; a circular brownish

black spot on lateral margin of sclerite; middle stripe entire, the lateral stripes continued across the suture and suffusing the scutal lobes; median area of scutum and base of scutellum yellowish testaceous; scutellum black, the parascutella pale; postnotum black, the extreme cephalic lateral angles obscure yellow. Pleura black, the dorsal and caudal margins of the pleurotergite paler. Halteres pale, the knobs weakly infuscated. Legs with the fore and middle coxae black; posterior coxae yellow; trochanters obscure brownish yellow; femora yellow, the tips conspicuously brownish black, preceded by a slightly more extensive yellow ring, which in turn, is preceded by a subequal dark brown ring; tibiae brownish yellow, the tips narrowly infuscated; tarsi passing into brownish black. Wings light yellow, the base and costal region brighter yellow; stigma a very pale brown ring, the center paler, with *r* a little beyond the middle; inconspicuous dark brown seams at tip of Sc_1 , origin and distal third of R_4 , along the cord and outer end of cell 1st M_2 and, more conspicuously, along vein Cu ; veins dark brown, yellow in the flavous areas. Venation: Sc_1 ending just beyond midlength of R_4 , Sc_2 longer than Sc_1 and near its tip; R_8 feebly arcuated, subsinuous; *r* about twice its length from the tip of R_1 ; inner ends of cells R_8 and 1st M_2 lying proximad of cell R_5 ; basal deflection of Cu_1 near the fork of M .

Abdomen obscure brownish yellow, the bases of the subterminal segments somewhat darker. Ovipositor with the tergal valves slender, reddish horn-color; sternal valves straight.

Habitat.—Japan (Honshiu). *Holotype*, ♀, Hinoëmata, Iwa-shiro-no-kuni, altitude 3280–6235 feet, July 24, 1923 (T. Esaki).

Limonia mendax, new species.

Belongs to the *quadrinotata* group; general coloration black, the mesothorax sparsely dusted with gray; knobs of halteres dark brown; legs black, the femora with a conspicuous orange subterminal ring; wings yellow, sparsely variegated with brown; cell R with no spots between arculus and origin of

R_3 ; abdominal tergites brownish black, the basal half of the individual segments obscure yellow.

Female.—Length, 11 mm.; wing, 13 mm.

Rostrum shiny black, the palpi dark brown. Antennae with the scape obscure orange, the flagellum dark brown; basal segments oval, the terminal segments passing into cylindrical. Head heavily golden-yellow in front, black on the posterior vertex and occiput.

Pronotum black, the posterior lateral angles paler. Mesonotum black, the praescutum sparsely yellow pollinose, the scutellum and postnotum sparsely gray pruinose. Pleura black, pruinose, especially on the anepisternum and sternopleurite. Halteres obscure yellow, the knobs conspicuously dark brown. Legs with the coxae yellow, the fore and middle coxae infuscated basally; trochanters obscure yellow; femora black, each with a relatively narrow but conspicuous orange ring about its own length from the tip; tibiae black, the extreme base and a subterminal ring a little paler; tarsi black. Wings yellow, sparsely variegated with dark and paler brown; cells C and Sc entirely clear yellow; dark brown seams at origin of R_1 , along cord and outer end of cell 1st M_2 and behind vein Cu ; paler clouds forming an irregular fascia before the wing-tip and again in the ends of the anal cells; longitudinal veins narrowly seamed with brown; bases of cells R and M only faintly darkened; veins black, paler in the costal region. Venation: r at tip of R_1 ; basal deflection of Cu_1 about one-fourth its length before the fork of M .

Abdominal tergites brownish black, the basal half of the sclerites obscure yellow, on the intermediate segments restricted to broad basal triangles; on the posterior segments more uniformly blackened; sternites obscure yellow, the caudal margins of the segments darkened. Genital segment obscure yellow. Ovipositor with the tergal valves small and slender; sternal valves short but very deep, blade-like.

Habitat.—Japan (Hokkaido). *Holotype*, ♀, Jozankei, Ishikari-no-kuni, altitude 1000 feet, August 16, 1923 (T. Esaki).

***Limonia euphileta*, new species.**

General coloration light yellow; antennae yellow, the basal segment black; head dark yellowish gray; halteres long and slender, the knobs light yellow; tips of femora blackened; wings yellowish gray, the stigma pale brown.

Female.—Length, 7.5 mm.; wing, 8.8 mm.

Rostrum and palpi black. Antennae with the basal segment black, sparsely pruinose, the remainder of the organ yellow, the terminal flagellar segments a very little darker. Head dark yellowish gray, the cervical sclerites concolorous.

Pronotum brownish yellow. Mesonotum and pleura clear light yellow throughout. Halteres long and slender, pale, the knobs light yellow. Legs yellow, the femoral tips conspicuous brownish black, the tibial tips narrowly infuscated, the tarsal segments soon passing into black. Wings tinged with yellowish gray, the base and costal region a little more yellowish; stigma oval, pale brown; veins dark brown, paler on the basal half of wing. Venation: Sc relatively short, Sc_1 ending about opposite one-third the length of R_1 , Sc_2 not far from its tip; R angulated at origin; r at tip of R_1 ; basal deflection of Cu_1 at or before the fork of M .

Abdomen yellow, the base of the sternal valves of the ovipositor blackened. Ovipositor of rather peculiar structure; tergal valves very short, scarcely exceeding the tips of the sternal valves, the latter broad on the blackened parts, suddenly narrowed into the median depressed blades.

Habitat.—Japan (Honshiu). *Holotype*, ♀, Ozenuma, on boundary between Iwashiro-no-kuni and Kotsuke-no-kuni, altitude 5460 feet, July 26, 1923 (T. Esaki). *Paratype*, ♀, Kawamata, in mountains, Shimotsuke-no-kuni, July 23, 1923 (T. Esaki).

***Limonia crinita*, new species.**

Male.—Length about 5.5 mm.; wing, 6.3 mm.

Generally similar to *L. angustistria* Alexander (Northern Japan), differing chiefly in genitalic characters.

Head light gray. Pleural stripe even paler in color. Legs

distinctly stouter, the tips of the femora broadly and conspicuously dark brown; tibiae yellowish brown, the tips narrowly dark brown; tarsi passing into dark brown. Wings with a faint brown tinge, the base and costal region a little brighter; stigma oval, brown; paler brown seams at origin of R and along the cord and outer end of cell $1st\ M_2$; veins brown, veins Sc , R , Cu and the prearcular veins paler. Venation: Sc_1 ending opposite two-fifths the length of the weakly angulated R , Sc_2 close to its tip; r at tip of R_1 ; basal deflection of Cu_1 at the fork of M . Abdominal segments bicolorous, a little more than the caudal half dark brown, the bases testaceous yellow; sternites with the caudal portions a very little brighter than the base. Male hypopygium of a very peculiar structure. Basistyle with the mesal face produced mesad into three tubercles of various sizes, the largest one bearing a number of stout setae some of which are crenulate or so roughened as to appear almost branched. Ventral dististyle with the usual rostrum replaced by a powerful, arcuated, cylindrical, chitinized rod or arm, directed caudad and then mesad, the apex terminating in a powerful seta. Dorsal dististyle a very powerful, gently curved, heavily chitinized rod, tapering gradually to the acute tip, the outer margin with weak appressed spinulae.

Habitat.—Japan (Hokkaido). *Holotype*, ♂, Shimokebo, Hitaka-no-kuni, August 13, 1923 (S. Kuwayama).

***Limonia fusciceps*, new species.**

General coloration yellow; head brownish black, sparsely pruinose; antennal flagellum obscure brownish yellow; pronotum and an anterior triangle on the mesonotal praescutum shiny black; femora obscure yellow; wings amber-yellow, the stigma barely indicated; r far from tip of R_1 ; basal deflection of Cu_1 at or close to fork of M ; tergal valves of ovipositor bifid at tips.

Female.—Length about 7.8 mm.; wing, 9.2 mm.

Rostrum and palpi brownish black. Antennae with the basal segment brownish black; flagellum obscure brownish yellow,

the terminal segments somewhat darker; flagellar verticals relatively short. Head brownish black, sparsely pruinose.

Pronotum brownish black, the extreme lateral margin obscure yellow. Mesonotal praescutum orange-yellow with a shiny black anterior triangle, the point behind, becoming obsolete before midlength of the sclerite; remainder of mesonotum pale orange-yellow, the scutellum even paler. Pleura shiny obscure yellow. Halteres pale, the base of the stem brighter. Legs with the coxae and trochanters concolorous with the pleura; femora obscure yellow, the tips vaguely infuscated; tibiae and basitarsi brownish yellow, the terminal segments of the tarsi passing into brown. Wings with a clear, light amber-yellow tinge; stigma barely indicated; veins brown, those in the costal region and at the wing-base more yellowish. Venation: Sc_1 ending just before midlength of R , Sc_2 at its tip; R_s long and relatively straight; r nearly four times its length from the tip of R_1 ; basal deflection of Cu_1 at or immediately before the fork of M .

Abdomen pale reddish or testaceous yellow. Ovipositor with the tergal valves chitinized, strongly upcurved, the bases of the valves blackened, just before the tip on outer margin with an acute lateral spine, the apex thus appearing bifid; sternal valves pale, deep at base, relatively straight.

Habitat.—Japan (Hokkaido). *Holotype*, ♀, Shimokebo. Hitaka-no-kuni, August 13, 1923 (S. Kuwayama).

***Limonia inelegans*, new species.**

General coloration dark brown; antennae black, the flagellar segments short-pedicellate; wings strongly tinged with brown, the small oval stigma darker brown; Sc long, Sc_2 at tip of Sc_1 ; cell 1st M_2 small, subquadrate.

Female.—Length, 5–5.5 mm.; wing, 5.6–6.3 mm.

Rostrum and palpi black. Antennae black throughout, the flagellar segments oval, each with a short, shiny, apical pedicel. Head brown.

Mesonotum dark brown, sparsely pruinose, subshiny, the scutellum and postnotal mediotergite more heavily pruinose.

Pleura brown, sparsely pruinose. Halteres brown, the base of the stem yellow. Legs with the coxae obscure yellow, the fore coxae darker on outer face; femora obscure brownish yellow, the tips a little darkened; tibiae light brown; the basal segments of tarsi brownish yellow, the terminal segments passing into dark brown. Wings strongly tinged with brown, the small oval stigma darker brown; veins dark brown. Venation: Sc_1 ending opposite the fork of R_s , Sc_2 at its tip and subequal to it; R_s long, evenly arcuated, about twice the length of the arcuated deflection of R_{4+5} ; tip of R_1 obsolete or nearly so, r bending to R_{2+3} and appearing to capture the tip of R_1 ; cell 1st M_2 small to very small, in the type broader than long; in the paratype, $r-m$ short to subobsolete; basal deflection of Cu_1 at the fork of M .

Abdominal tergites dark reddish brown, the caudal margins indistinctly paler; sternites bicolorous, the basal half or more dark brown, the caudal half or less obscure brownish yellow. Ovipositor with the tergal valves slender but strongly up-curved, the sternal valves shiny black at base.

Habitat.—Japan (Hokkaido, Honshiu). *Holotype*, ♀, Chuzenji, Shimotsuke-no-kuni, Honshiu, altitude 4170 feet, July 22, 1923 (T. Esaki). *Paratype*, ♀, Jozankei, Ishikari-no-kuni, Hokkaido, altitude 1000 feet, August 16, 1923 (T. Esaki).

***Limnophila dicranophragmoides*, new species.**

Generally similar to a species of *Dicranophragma* but the supernumerary crossvein in cell R_2 lacking; legs yellow; wings with a heavy brown pattern arranged in six transverse ocellate cross-bands.

Sex?—Wing, 6.2 mm.

Rostrum and palpi brown. Antennal scape brown, the basal flagellar segment yellow, the remaining segments of the flagellum passing into brown. Head brown.

Mesonotal praescutum grayish brown with a pattern of scattered darker brown spots and dots, representing the broken praescutal stripes; scutal lobes with small brown centers; postnotum darkened. Pleura dark brown, vaguely

spotted with pale. Halteres broken. Legs with the coxae reddish brown; trochanters brownish yellow; remainder of the legs light yellow, the tips of the tibiae and basal tarsal segments faintly darkened; terminal tarsal segments infuscated. Wings with a yellowish tinge, with a heavy ocellate pattern, the markings arranged in more or less transverse bands across the wings, the centers dark; basal band with arculus as a center; second band across the base of cell R and midlength of cell $2nd\ A$; third band at level of origin of R_s ; fourth band very wide, at level of cord; subterminal band at level of tip of R_2 and fork of M_{1+2} ; wing-apex more uniformly darkened; veins yellow, dark brown in the infuscated areas. Venation: Sc_1 ending shortly beyond the fork of R_s , Sc_2 about twice its length from the tip of R_1 ; r about its length from the tip of R_1 ; R_{2+3} a little longer than the basal deflection of R_{4+5} ; no supernumerary crossvein in cell R_2 ; petiole of cell M_1 variable, from about one-half to equal to the cell; basal deflection of Cu_1 before midlength of cell $1st\ M_2$.

Abdomen broken.

Habitat.—Japan (Loochoo Islands). *Holotype*, Sex? Kunjan-gun, Okinawa, altitude 500–1000 feet, May, 1923 (S. Sakaguchi). *Paratype*, Sex? Shuri, Okinawa, altitude 500 feet, May, 1923 (S. Sakaguchi).

Nipponomyia, new genus.

Characters as in *Tricyphona*, with the following exceptions: Eyes glabrous. Wings with a peculiar and very characteristic pattern consisting of a yellow longitudinal stripe paralleling the costal margin to the wing-tip. Sc_2 far before the origin of R_s ; $r-m$ connecting with R_s some distance before the fork of the latter; R_{2+3} perpendicular at origin; in some species (*N. symphyletes*, *N. trispinosa*) veins R_{2+3+4} are united into a short to very short nearly perpendicular fusion at the end of R_s , the latter thus being in approximate alignment with R_5 ; fusion of R_1 and R_2 extensive; petiole of cell R_4 short to virtually lacking, in alignment with R_s ; cell $1st\ M_2$ closed or open; basal deflection of Cu_1 at the fork of M . Male hypopygium with the

dististyle crowned with from three to twelve heavily chitinated spines.

Genotype: Tricyphona kuwanai Alexander (Japan).

Besides the genotype, the following species belong to the genus *Nipponomyia*: *Tricyphona novempunctata* Senior-White (Khasia Hills, India, altitude 4908 feet); *T. symphyletes* Alexander (Formosa); and *T. trispinosa* Alexander (Japan, Honshiu).

ON BRITISH COLUMBIAN MYCETOPHILIDAE—II

(Diptera)

By C. B. D. GARRETT

***Mycomya atus*, new species.**

Male. Occiput and vertex grey-black, face, mouth parts and palpi brownish. Antennae; scape brownish, very small base of flagellum one, yellow, the remainder blackish. The basal few segments are twice as long as wide. The apical ones are longer. Thorax; dorsum grey black, indications of vittae by brownish, which also shows at the humeral angles and laterally, bristles dark brown. Scutellum brown with two pairs of bristles. Pleura blackish to brown, the sutures paler; coxae, femora and tibia yellow, midcoxal spurs short, reaching only about half way down their coxae, but with only one tip, whilst *calcarata* is bi-pronged. Abdomen; tergites 1, 7 and 8 dark brown, 2 to 4 dark with signs of pale yellow margins. Wing; Sc joins C distad or over mid cell R; Sc2 is proximad of the middle, and cell R is over twice as long as broad; petiole of M is much shorter than M2; Cu forks proximad of the R-M cross vein. Hypopygium; tergite half dorsally projects in a slightly curved piece with round corners, similar to the top piece of the back of an ordinary chair. From the lower lateral corner of this rise three much curved black bristles, curved upwards, three similar ones rise from the base nearer the center and still nearer the center another set of more curved and curving downwards. The sternite half has a wide open V round

the anus, at the top of the V on each side is a fleshy clasp directed up to the tergite, and at their inner base is a chitinized hook with its base on the lateral edge from where it curves up and inwards ending with its point over its base, the whole is at right angles to the previous fleshy clasp.

Described from 3 males, Vancouver, B. C., and Savary Island, March and April (R. S. Sherman).

Of the following species, *autumnatis*, *echinata* and *hamatus*, there are 20 females, but I am unable to fully separate them at present.

Mycomya autumnalis, new species.

Male. Occiput and front grey-black, mouth parts and palpi yellow. Antennae, scape and part of flagellum one, yellow, the remainder is missing. Thorax, dorsum, darkish brown, primrose in some lights, grey in others. The bristles black. Scutellum dark with one pair of bristles. Coxae yellow, the two hind pairs with a brown patch on the outer side. Mid coxal spurs long and curved. Abdomen dark brown. Wings; Sc ends free, at or slightly beyond Sc2; Sc2 is over mid cell R which is twice as long as deep. Petiole of M shorter than M2; Cu forks below the proximad end of the RM cross-vein. Hypopygium; tergite half terminates centrally in a large round flap slightly pointed at its tip; this occupies most of the dorsal surface of the tergite which on its lower lateral corner runs out to a long thin pale yellow fleshy flap. The sternite half has near its center two prongs directed upwards, between which the usual mid pair of blades show from within. On each side of these are two chitinized points, longer than usual and with a common base.

Described from 1 male, 1 female, Michel, B. C., September 27 (C. Garrett).

Mycomya hamatus, new species.

Occiput to front grey-black, face brown, mouth parts and palpi yellow. Antennae, scape and base of flagellum one yellow, the remainder brown; the basal segments are not, and the apical are twice as long as wide. Thorax; most of the dorsum

is occupied by the three fused brown-black vittae, but the humeral corner and laterally it is brown yellow, the bristles are black or brown. Pleura brownish, propleura yellow, the scutellum is covered by glue. Abdomen; segments dark brown with their posterior margins yellow. Coxae yellow and coxal spurs long, reaching the face. Wing; C ends beyond the apex of the wing. The tip of Sc is atrophied but reaches C over the distal end of cell R. Sc₂ is over the middle of cell R which is hardly twice as long as deep. Petiole of M hardly equals M₂; Cu forks proximad of the RM cross-vein. The hypopygium is yellow and not mounted on a slide; its chief feature is a pair of long lateral claspers, of pale yellow chitin with a blade-like lower edge.

Holotype male, Wilson Creek, 5,200 feet, Michel, B. C. (C. Garrett).

Mycomya echinata, new species.

Male. Occiput and front grey black; face brown or grey, mouth parts and palpi yellow. Antennae scape and most of flagellum one, and a spot or two yellow, the remainder grey-black. The basal segments are not, and the apical ones are, over twice as long as wide. Thorax; dorsum grey-black, a large brown patch at the humeral angles and some laterally. The bristles are black. Scutellum dark brown with one long pair of bristles. Pleura grey-black, except the propleura which is yellow-brown, and the pteropleura has brown shades. Coxae, yellow, the hind one with a brown patch on the outer side which is sometimes large. Mid coxal spurs long thin and curved. Abdomen brown, the tergites posteriorly showing signs of a yellow margin, and also the lateral edge. Sternites yellow, all the hairs brown.

Wing; C ends at the apex of the wing; Sc ends free just beyond Sc₂ or does not pass it, Sc₂ is slightly proximad of or over mid cell R which is just about twice as long as deep. Petiole of M is equal, slightly shorter or longer than M₂; Cu forks below or proximad of the proximad end of the RM cross vein.

Hypopygium. Tergite half; runs laterally into a fleshy flap each side, directed obliquely; in the center between and from within, rises perpendicularly a T column like a pile of T's on top of one another with the stem pointing into the hypopygium; from the inner base the soft mid pad rises.

The sternite half, from the middle of its edge have a pair of points, the outer side of which angle down low and then up to the tip of the lateral corner which appears as a triangular point. From within are the usual mid pair of blades on each side of which are a pair of chitinized spikes, rather longer than usual and they have a common base.

Described from 5 males, Michel, B. C., August and September (C. Garrett); Vancouver, B. C., February 5, and May 23 (R. Sherman). There are several females.

***Mycomya durus*, new species.**

Male. Occiput to front grey-black. Mouth parts and palpi yellow. Antennae missing. Thorax grey-black, its humeral corners and lateral edges brown. Scutellum brownish, all bristles black. Pleura dark, propleura brown. Coxae yellow, the hind one with a brown patch on the outer side. No mid coxal spurs. Fore coxal on its apical, inner half set with a number of short black hairs, perpendicularly, appearing like a brush. Usually this part is bare in all species of *Mycomya*. Abdomen dark brown, tergite segments 3 and 4 with slight posterior yellow margins. Wing; Sc joins C about over mid cell R; Sc2 is slightly proximad of this, cell R is twice as long as deep. Petiole of M is shorter than M2. Cu forks below the proximal end of the RM cross vein. Hypopygium. Tergite half, is semicircular, with a truncate end on which projects a pair of disconnected oval pads set with short black pilosity (much as in *Boletina obscura*). Sternite half seems entirely pale yellow chitin, with a horse shoe shaped round the anus, its arms ending in strong curved claspers directed inwards, in front on the inner side of these, rise an upright chitinized spike. There are minor things within.

Holotype male, Vancouver, B. C., November 10, 1917 (R. Sherman).

Mycomya armata, new species.

Male. Occiput to front black, face, mouth parts and palpi brownish, the basal segments shorter than the apical ones. Thoracic, dorsum, scutellum and pleura brown, all bristles brown. Coxae muddy yellow, no mid coxal spurs, inner side of fore coxae as in *M. durus*. Abdomen brown. Wing Sc joins C slightly distad and Sc2 slightly proximad of mid cell R which is twice as long as deep. Petiole of M not as long as M2; Cu forks below the proximal end of the RM cross vein.

Hypopygium. Tergite half, the last part in the middle projects V shape, the angle mesad and wide. Its edge is set with short regular hairs with longer ones at the apex. From within at the base of this the usual mid pad rises, which is spoon shaped.

The sternite half from near the anus rise a divergent pair of chitinized, flat, spiricle appendages. The top lateral corner of the sternite ends in a long sharply pointed chitinized spike.

Holotype male, May 5, 1917. Caulfields, B. C. (R. Sherman).

Boletina montanus, new species.

Male and Female. Belonging to *imitator*, *notescens* group. Occiput to front black. Mouth parts and palpi yellow. Antennae; Scape yellow, flagellum one shaded yellow, the remainder black. The segments over twice as long as wide. Thorax, dorsum blue-grey-black, primrose with three smooth black vittae; the hairs and bristles yellow Scutellum grey black with yellow bristles, pleura grey-black, propleura yellow. The epimerum set with long pale pile. Abdomen black with pale hairs. Coxae yellow with yellow pile. Trochanters blackish, and all claws with a basal tooth. Halteres yellow. Wing; C does not reach the apex of the wing, but is produced about a quarter past RS; Sc enters over the base of RS; Sc2 slightly distad of mid Sc. Petiole of M about equal to the RM cross-vein, Cu forks below or proximad of the latter.

Hypopygium. In shape very similar to Johannsen's fig. 150 for "*imitans*." The tergite half black. Sternite half black except the two pairs of claspers which are bright yellow.

In this species the central pair of claspers (shown in fig. 150) are not bipronged and all is dark chitin. The long superior claspers are about the same but the short chitinized pair are bent in the middle and bipronged.

Described from 3 males and 3 females, Fernie, B. C., July 21 to 24 (C. Garrett).

***Mycomya oviducta*, new species.**

Female. A series of six females seem worthy of record. They belong to the group possessing pilose epimerum, but there are no cerci, and the ovipositor is similar to many found in Orthoptera, being slightly chitinized and upturned in a half circle, and fully twice as long as the length of the abdominal segment. Occiput to front grey-black, face dark, mouth parts and bases of palpi dusky, apex of palpi yellow, antennae and scape black. Thorax as in *Montanus*, but the vittae are all fused, the whole forming a pattern of a spade in playing cards, and polished. Scutellum and pleura dark. Abdomen and ovipositor dark brown. Coxae yellow. Trochanters dusky, all claws with a basal tooth. Wing; C does not reach the apex of the wing, it stops at the tip of RS or is produced one fifth. Sc enters C over the base of RS. Sc2 is slightly distad of mid SC or more. The petiole of M is equal or shorter than the RM cross vein. Cu forks below or proximad of the latter.

Described from 6 females, Wilson Creek, 5,200 feet. Michel, B. C., September 7 to 24 (C. Garrett).

***Boletina astacus*, new species.**

Male and female. Easily recognized by the positions of the SC cross veins, which is less than its own length proximad of the base RS.

Occiput to front grey-black. Mouth parts dusky, palpi yellow. Antennae, scape, and two or three basal segments of the flagellum yellow, the remainder brown. The segments hardly twice as long as wide. Thorax, dorsum all polished

black. In one male, the edges are all grey-primrose; pleura dark; coxae yellow, the base of the hind one with a brown patch. All claws with a basal tooth. Abdomen brown-black. Wing; C hardly reaches the level of the apex of the wing, and is produced past RM nearly one third. Sc joins C just past the base of RS; Sc2 slightly proximad of the latter. The RM cross-vein is short, about equal to the basal section of RS. Petiole of M very long, nearly equal to Cu2; Cu forks a long way distad of the RS base.

Hypopygium. The lateral view is somewhat like a lobster's claw. The base of the tergite half is yellow shading to brown, and dark brown tips. The whole is narrow, cylindrical, and half as long again as any tergite segment. Dorsally from the base, it splits in half, the apical third being thumb-like. Sternite half is dark brown and runs the full length, ending in an oval tip. There is an open space between the tergite and sternite tips for the apical third as they do not occupy the full depth of the segment.

Described from 2 males and 1 female, June 16, Caulfields, B. C. (R. S. Sherman).

Boletina anticus, new species.

Belonging to the *gracilis* group. Male. Occiput to face grey-black, palpi yellow; Antennae long and thin; Scape yellow-brown, flagellum black brown, the segments long and narrow, perhaps four times as long as wide. Thorax; dorsum brown with three distinct black vittae, scutellum brown. All hairs and bristles yellow. Pleura brown to dark; a row of short yellow hairs along the hind mesopleural suture. Coxae yellow, the hind one dull, all claws with a basal tooth. Halteres yellow, the tip dusky. Abdomen dark brown, the extreme posterior edges showing some yellow; Wing; C and RS nearly reach the apex of the wing, and C is very slightly produced; Sc joins C proximad of RS; Sc2 is about the mid of the former. Petiole of M about $1\frac{1}{2}$ or 2 times as long as the RM cross-vein and longer than Cu2; Cu forks far past RS and near to the fork of M.

Hypopygium; somewhat the shape of Johannsen's fig. 152, but is deeper, forming more of a triangle. Compare fig. 152; in this species the dorsal plate is divided into three parts. The central part has a straight end on which are a pair of cerci like appendages. The inner corner of the side piece of the dorsal plate runs up into a triangular point, the tip reaching half way up the cerci-like appendages. The lateral superior claspers are straight, the tip is capped by a bunch of short thick black hairs; near the tip on the inner side is a notch and a small cylindrical appendage from it. The sternite half has a split base, which about half way angles out, forming a square frame round the penal appendages; here is a pair of strong hooks and a stem but no basal hood.

The female has distinct pale yellow posterior margins to the tergites.

Described from 4 males and 3 females, Wilson Creek, Michel, B. C., September 21 to 24 (C. Garrett).

***Boletina antomus*, new species.**

Male. Very similar to *Boletina anticus* except, scape more yellow. The two hind coxae have apical dusky patches or wholly so. Tip of the halteres yellow. Hypopygium as *B. anticus*, but the dorsal cerci-like appendages are different, being narrow. The inner corner of the side piece in the dorsal plate ends in a fine small point which runs into a long triangular lobe.

The sternite half is similar to *B. anticus*, but lacks the mid pair of hooks, having instead a cucullus over the penal appendages. The inner side of the superior claspers both in *anticus* and *atomus* is set with many short chitinated tubercles.

Described from 6 males and 13 females, Wilson Creek, Michel, B. C., September; Cranbrook, B. C., April (C. Garrett).

***Boletina shermani*, new species.**

Belongs to the *nacta* group. In the type description of *nacta* Johnn., the hypopygium is said to be as *Boletina gracilis*.

This species has the general shape of fig. 150 given for *imitator*, and also lacks the smaller bi-pronged basal claspers. If I have judged wrongly, then I have another species of the *antenus* group, which I now call "*gracilis*" Johnn.

Male. Occiput to face grey-black, palpi yellow. Antennae brown-black. Thorax, dorsum dull brown, with three indistinct vittae of a darker shade. Pleura grey-black. Coxae yellow, the hind one muddy yellow, all claws with a thumb-like basal tooth. Abdomen dark brown. Wing; C hardly reaches the apex of the wing and is not produced past RS; Sc joins C proximad of base RS; Sc2 absent; RM cross-vein and petiole of M about equal in length. M forks below base of RS, Cu forks slightly proximad. Hypopygium, all black except the long pair of sternite claspers, which are pale yellow, each has a long bristle on the inner side above half way, and a shorter one above, and bi-pronged tips. The mid piece below also runs nearly to the apex of the tergite half. The dorsal or ventral view of the whole is pear-shaped, the apex being about half the width of the base.

Described from 3 males and 7 females from Vancouver, Capilano, and Seymore Creek, all in British Columbia, April and May (R. S. Sherman).

***Boletina jucunda*, new species.**

Male; Occiput to front grey-black. Face and mouth parts dark to brown. Palpi yellow or dusky; Antennae dark brown. Thorax grey-primrose, the three vittae slightly showing, smooth; scutellum dark. All hairs and bristles yellow. Pleura grey-black. Coxae yellow, the two hind ones blackish. All claws very small and modified, scoop-shaped. Abdomen and hypopygium dark brown. Wing; C reaches the apex of the wing and is produced half way past RS; Sc joins C over the base of RS; Sc2 is far distad of mid SC; RM cross-vein is shorter than the petiole of M; Cu forks slightly distad of the proximal end of the RM cross-vein. Hypopygium: General shape as fig. 146 given for *obscura*, but the lateral flaps have no chitinized hook, but have two inner points, the lower one

with a small nail-like claw on it. The pair of curved claspers shown in between these are long, reaching the apex of the hypopygium and are divergent. There are other minor points of difference.

The type series is from British Columbia but I have not the full notes with me.

Boletina differens, new species.

Allied to the *nacta* group and *shermani*, the position of the fork of Cu is apt to throw it to genus *Phthina*, but I would consider it a true *Boletina*.

Male. Occiput to front grey-black; face and mouth parts dark brown; palpi yellow. Antennae. scape dark brown, flagellum black. Thorax; dorsum grey-brown, opaque, with three smooth black vittae. Bristles and hairs yellow-brown. Pleura grey-black, propleura brown. Abdomen black-brown. Hypopygium yellow-brown, the apical half of the tergite black. Coxae yellow, trochanters slightly blackish. Claws of the fore legs missing, but those of the hind legs apparently simple, but they might have a small basal tooth hidden by the pulvi. Halterers yellow, tip slightly dusky. Wing; C does not reach the apex of the wing, and is not produced past RS; Sc enters C proximad of RS and about over the middle of the RM cross-vein, which is straight or nearly so, appearing like a longitudinal vein, and the petiole of M hardly twice as long as the latter; Cu forks below or slightly distad of the fork of M; Sc2 is about mid SC.

Hypopygium somewhat similar to *B. shermani*, but the long pale yellow claspers have only one tip.

Monotype, Fernie, B. C., July 21 (C. Garrett).

Boletina unusus, new species.

The position of the forks Cu would tend to place it in genus *Phthina* but I would consider it a true *Boletina*.

Male; Occiput to front grey-black, face and mouth parts brown, palpi more yellow. Antennae: scape and next two joints yellow, the next six blackish, and hardly longer than

broad. The remainder brown. Thorax is yellow-brown, the three vittae fused and occupying most of the dorsum; scutellum brown; pleura and metanotum yellow, the latter with a dark central patch. Abdomen; tergites mixed, no definite sharp pattern, but the segments appear to have bases dark brown with their centers produced nearly or reaching the posterior margins, the lateral parts and apical corners yellow to brown. Coxae yellow, trochanters blackish, of the five legs present, there are only claws on the fore leg. These are very small and modified. Halteres yellow. Wing; tips are damaged. SC enters C over RS; Sc χ is distad of SC. The RM cross-vein and petiole of M about equal; Cu forks distad of the M fork. Hypopygium is shaped between fig. 146 and fig. 150, being those of *obscura* and *imitator*. The forceps are also a grade between, the outer or fleshy part of the claspers are elongate but not as long as in fig. 150, the basal chitinized spine is quite short and curved, its tip ends in two points. Between these appear what may be the usual blades and points commonly found in *Mycomya*.

Monotype, Ithaca, N. Y., July 4, 1920.

THE LARVA OF AEDES (OCHLEROTATUS) EUCEPHALEUS DYAR AND AEDES (OCHLEROTATUS) HORTATOR DYAR & KNAB

(Diptera, Culicidae)

By C. BONNE

Aedes eucephaleus Dyar.

Larva. Head rounded, narrowed before eyes, a slight notch at insertions of antennae, front margin arcuate. Antennae cylindrical, slender, uniform, sparsely spined, a small tuft at the middle, four spines of irregular length at tip and a digit on a pedestal. Upper pair of dorsal head hairs single, lower pair double, anteantennal tuft three haired. Mental plate triangular, a central tooth and fifteen on each side. Body glabrous. Air tube bulging on basal half, three times as long as wide; pecten

of three rudimentary basal teeth and six brown complete teeth, evenly spaced, occupying basal third, each tooth with two small basal spines. A multiple tuft beyond. Lateral comb of eighth segment of eight scales in a row, single scale long, tapered to a point, not fringed. Anal segment much broader than long, ringed by the plate; dorsal tuft a long hair and brush on each side; ventral brush well developed, not exceeding the barred area; anal gills very long, longer than the whole body, gradually tapering to a point and with an enormously developed stout central trachea.

The pale larvae live in temporary rainpools in the woods. They lie on their backs on the bottom of the pools, almost invisible. Zandery, Kabelstation, Surinam.

***Aedes hortator* Dyar & Knab.**

Larva. Head rounded. Antennae long, uniform, spicular, curved, a three haired tuft at the middle, a long hair, a short one and a digit at the tips. Headhairs all multiple, anteantennal tuft multiple. Mental plate triangular, a central tooth and fifteen on each side. Skin of body smooth. A large number of fine palmate hair tufts on abdomen, the hairs of which are feathered. Comb of the eighth segment in a triangular patch, each scale elongate, with terminal fringe of spinules, the central one longest. Air tube stout, about three times as long as wide, tapering beyond outer half. Pecten of fourteen or fifteen teeth on basal third, a multiple tuft of long hairs more apically but still at basal half of the tube. Each tooth of the pecten with one or two basal side branches. Pecten teeth becoming longer farther away from the base of the tube. Anal segments about as long as wide; plate reaching well down the sides, a tuft and a long hair dorsally on each side, laterally a small single hair. Ventral brush on the barred area, well developed, a small four haired tuft present separated from the brush. Anal gills pointed, unequal, longer pair more than four times the length of the segments.

The larvae live in temporary pools in the woods, where the females attack men. Zandery, Kabelstation, Surinam.

THE MALE OF *ANOPHELES VESTITIPENNIS* DYAR & KNAB

(*Diptera, Culicidae*)

BY HARRISON G. DYAR

Anopheles vestitipennis D. & K is known only from the female adult, with peculiar distribution, Mexico, Guatemala and the Greater Antilles (Cuba and Jamaica). It has not been taken in Costa Rica or Panama.

Last summer, Dr. W. C. Earle, of the International Health Board, Rockefeller Foundation, bred the species in Porto Rico, adults in June. The larvae sent are immature, but the male hypopygium is worthy of description.

Using the terminology of Dr. Root's paper (*Amer. Journ. Hygiene*, iii, 264-279, 1923) for the sake of comparison, the species falls in the subgenus *Anopheles*, having two basal spines.

Side piece twice as long as wide, strongly chitinized, with an apical slit to receive the clasper when bent; many scales on the outer side.

Basal spines two, arising separately, without prominence or common chitinization, nearly equal and curved at tip. Internal spine slender, moderately long, curved and with tapered tip.

Clasper half again longer than the side piece, strongly chitinized, with two very minute setae before tip. Apical claw stout, very short.

Claspette; ventral lobe strong and well chitinized, prominent, with two spines, one of which is enlarged—spatulate at the tip and encloses or is fused with the other. Dorsal lobe setose with two spines at tip, the outer one stouter than the inner.

Mesosome moderate, with a single long stout smooth spine on each side at tip.

Processes of the ninth tergite strongly developed from conical bases, stout, tips conical, as long as the fused spines on dorsal lobe of claspette. Anal lobe prominent, setose.

Nearest to *grabhamii* Theobald, differing principally in the less chitinized and produced base of the basal spines, and in the more strongly developed processes of the ninth tergite.

NOTES AND DESCRIPTIONS OF AUSTRALIAN CHALCID-FLIES—II

(*Hymenoptera*)

By A. A. GIRAULT

Ovidia, new genus (*Callimomidae*).

Head a little wider than long, face plain, frons above quadrate or nearly, antennae inserted upon its cephalic margin, thus much over half up the eyes and much above middle of face; cheeks short. Prothorax long, conical, the head at its apex upon a short neck; prothorax exceeding the cylindrical scutum, latter projected beyond the parapsides for nearly half its length, furrows distinct; scutellum smaller but somewhat similar to scutum, simple. Propodeum long, with a median line of foveae, no lateral carinae, spiracle cephalad. Abdomen sessile, narrowed at base, compressed, ovipositor as long as body, valves feathery; abdomen 2 apparently divided into a ventral tongue which extends along meson to apex and a dorsal narrow flap which has a long tongue to middle of abdomen; other segments not long. Marginal elongate, stigmal very short, oblique, post-marginal over twice stigmal. Antennae 11-jointed, one ring, one club, scape rectangularly exfoliated, flagellum uniform in width, compressed. Antennae inserted on either side of median line far from eyes. Head resembles that of *Æschylia* Girault.

Ovidia conicicollis, new species.

Purple, head green, sides of abdomen at middle, tarsi, tibiae 1–2 red, venation, black, wings subhyaline; ovipositor valves with a long white annulus beyond middle, a bit over half the black distad of it. Ocelli in a curved line, central, lateral about halfway between eye and cephalic. Funicle 1 cupshaped, somewhat longest, rest more or less quadrate; pedicel very small, subglobular. Club ovate, exceeding funicle 1. Face with dense pin punctures, frons and scutum reticulated very finely.

Nelson, May, 1920, A. P. Dodd.

Secodella ovativentris, new species.

Characterized by the shape of the abdomen, which is a bit smaller than thorax, ovate and somewhat compressed, no stylus,

the ovipositor valves inconspicuous. Blue, wings clear, postmarginal a bit exceeding stigmal, tibial tips, basal 3 joints tarsi, white. Funicles somewhat wider than long, 1 a bit the smallest, pedicel somewhat larger. Jaws with 2 equal acute teeth and an inner obtuse very small third. Second ring-joint obscure.

Wynnum, Q., forest, July 13, 1921.

Parooderella simplicifrons, new species.

As *aptera* Girault but less robust, frons convex and simple, lateral ocelli midway between eye and cephalic (in other twice closer to eye), fore wing subhyaline along distal half, with the two terminal bristles of submarginal short, a few discal cilia near apex: fore wings almost a half shorter. In both, pronotum with a median channel, abdomen widest before apex, axillae elongate, scutellum narrow, very acuminate cephalad, club solid, long.

Kuranda, Q., A. P. Dodd.

Raphaelonia, new genus (Entedoninae).

Like *Pleurotropomyia* but stigmal, postmarginal short, equal, scutum with complete, foveate (broken) grooved line, propodeum with a ridge-like median, no lateral carina, the minute spiracle embraced by a sulcus along cephalic margin which just laterad of spiracle curves caudad. Parapsidal furrows deep, complete. Scutellum simple. Petiole short, abdomen ovate, 2 short, equal to the last. Jaws with 3 large, acute teeth, decreasing in size from 1-3. Ring-joints large, subequal, club 2 nipped at apex.

Raphaelonia sulcatiscutum, new species.

Brilliant purple, scutellum green, wings clear save stigmal knob, veins dark. Legs whitish save coxae; scape yellowish along sides. Funicles 1-2 twice longer than wide, equal pedicel, 3 somewhat shorter, equal club 1 which much exceeds club 2. Face and frons smooth. Thorax scaly, cephalic scutum finely cross-lined. Segments 4-7 of abdomen finely cross-lined and with a cross-row of setae distad, setae general on 7.

A female, forest, Birkdale, Q., June 30, 1921.

Anogmoidea, new genus.

As *Paranogmus* but antennae a bit above eye ends, clavate, 13-jointed, 4 unequal ring-joints, club 3-jointed, propodeum with median carina only. Head wider than thorax, clypeus striate, truncate at apex. Abdomen $2\frac{1}{5}$ surface, slightly notched behind at meson, 6 and 7 next longest, 3 very short. Stigmal and postmarginal veins shorter.

Anogmoidea joulei, new species.

As genotype of named genus but femur 3 dusky, antennae red-yellow; ring-joint 4 half length of funicle 1 which is a bit wider than long, the others similar but increase in size distad. Jaw 4 no wider than others. Abdomen produced beneath at base. Habitus of *Paruriella*.

Two females, forest, Pentland, Q., January 18, 1918.

Arthrolytus hallami, new species.

Green, wings clear, antennae except scape (except at base) and pedicel and the legs (except coxae, femur 1, tibia 1 down whole centre of one side—a spot on opposite side below knees—and an elongate spot along the middle of one side of femur 2), lemon. As description of *Apirene* genotype structurally but jaws 4-dentate, antennae central, funicle 1 longer than pedicel, nearly twice longer than wide, 6 quadrate; abdomen with a short petiole. Face nonstriate. Hind tibial spur long.

Tumoulin, Q., forest, March 12, 1919.

Tritneptis hemerocampae Girault.

This is a synonym of *Dibrachys boucheanus* Ratz.

Rhynchentedon maximus Girault.

The jaws are *edentate*, no teeth.

Lutheria cyanea Girault.

This is the correct specific name of this genotype and not *ajanea* as published; the venation reaches costa at apex of *post-marginal* which is $\frac{2}{3}$ the stigmal, the marginal punctiform.

Systolomophella lyra Girault.

In the original description, the reference to another species of the same genus is to *dinotipennis*, published *cinotipennis*.

Chalcis vegai, new species.

Abdomen of *Stomatoceras*. Antennae slightly above the ventral end of eyes. Black, base of scape, abdomen 2 except above at apex more or less widely, 3 beneath and ventral median line, tibiae 1 and 2 except dorsal edge widely centrally, 1 suffused with reddish, femora 1 and 2 rather widely at apex, apex of 3 (preceded by a dusky border), distal one-third tibia 3 above and an elongate spot its own length below knee (shorter than the distal mark), tarsi, honey. Wings subhyaline, postmarginal about half the marginal, stigmal short. Nine femoral teeth. Apex scutellum bidentate. Punctate. Propodeum rugose, with a median channel. Femoral furrow obliquely fine-striate; dorsal half mesopleurum in front of furrow glabrous, densely punctate ventrad. Clothing inconspicuous.

Brisbane, Q., H. Hacker.

Chalcis rex, new name.

C. robusta Girault, preoccupied.

Chalcis silvae, new name.

C. tegularis Cameron, preoccupied.

Chalcis marmonti, new species.

Annulus tibia 3 incomplete. Small. Lateral ocelli twice closer eyes than to cephalic; tibiae 1-2 black save ends and 1 below; 11 femoral teeth. As *epicteti*. Southport, May 5, 1924, sand dunes.

Chalcis corneillei, new species.

As *pulchripes* (G. and D.) but scape black. Sides, venter abdomen, red. Legs save tarsi, inner side tibia 1, knees 1-2 black, rest golden. Tegula black. National Park, Nov., Hacker.

Chalcis yamalae, new species.

As *brisbanensis* but tibia 3 dorsad black only at base. Yamala, Q., May 9, 1924, F. G. Holdaway.

Chalcis delii, new species.

As *aureus* but coxa 3 red, femur 3 all red. On *Delias argenthona*. Bribie Island, Jan'y, H. Hacker.

Chalcis schuberti, new species.

As *vegai* but abdomen normal, coxa 3 red, apex tegula yellow. Darlington, W. Australia, Sept. 7, 1912, G. H. Hardy.

Chalcis veronesini, new species.

As *curtisi* but basal yellow tibia 3 shorter than basal red, femur 3 apex yellow above. Hobart, Tas., Jan. 25, 1918, G. H. Hardy.

Chalcis epicteti, new species.

As *rex* but black of tibia 3 distinctly exceeding distal yellow. On *Delias argenthona* with *delii*.

Chalcis aequalipunctatus, new species.

Flagellum save pedicel red; tegula black. Legs black, marked with yellow. Abdomen 2 above, basal 1/2, red. Brisbane, Hacker.

Chalcis tasmaniensis Girault.

This is *C. opponens* Walker.

NOTE ON AEDES ALOPONOTUM AND OTHER SPECIES OF ITS REGION

(Diptera, Culicidae)

BY HARRISON G. DYAR

Aedes aloponotum Dyar.

Aedes aloponotum Dyar, Ins. Ins. Mens., v, 98, 1917.

Aedes fletcheri aloponotum Dyar, Ins. Ins. Mens., viii, 112, 1920.

Aedes flavescens (?) *aloponotum* Dyar, Proc. U. S. Nat. Mus., lxii, 75, 1922.

Aedes riparius (?) *aloponotum* Dyar, Ins. Ins. Mens., xi, 92, 1923.

This species, hitherto known only by females, bears a striking resemblance to *Aedes riparius*, which I at one time confused with *flavescens* Müll. (*fletcheri* Coq.). Except for the detached

distribution, I would probably have referred it to the synonymy. In order to settle the question, a special trip was made to the Puget Sound region in the spring of 1924. A pond was found near Hoodspoint, Washington, heavily overgrown with a water-plant, which Mr. Paul C. Standley has kindly determined as *Veronica scutellata*. The water was very cold, and no larvae were visible; but by persistent dipping with a strainer, a considerable number were obtained. By the larva and male hypopygium it is seen that the species is not related to *riparius*, but comes very close to *excrucians* Walk. There are slight differences, however, and I consider that a distinct species is indicated.

Male hypopygium. Side piece three times as long as wide, the tip rounded, hairy, with a few small scales on the outer side; apical lobe conical, prominent, with many small delicate setae from rather large tubercles; no basal lobe, the rugose area running up to base of apical lobe. Claspette stem rather long, slender, markedly constricted at apical fourth, the tip a little expanded at insertion of filament; filament shorter than the stem, with widely expanded blade, sharply cut at base and tapering to tip. Ninth tergites small, with five spines, three times as long as the prominence.

Larva. Antennae slender, rather long, infuscated outwardly, spinose, a 6-haired tuft near the middle. Clypeal hairs coarse, upper in 3 or 4, lower in 2. Lateral abdominal hairs single after the second segment. Skin minutely spicular, quite strongly and densely so. Scales of the comb of eighth segment about 35, in a patch three rows deep, the single scale with distinct central spine, stronger than the lateral spines. Air tube nearly four times as long as wide, regularly tapering outwardly, with long terminal hooks; pecten of about 25 teeth, the last or last two teeth detached, rarely not any detached, followed by a large six-haired tuft. Anal segment longer than wide, the dorsal plate reaching near the ventral line but not encircling; ventral brush with small tufts preceding; dorsal posterior hairs a single hair and large tuft on each side; anal gills four, equal, longer than the segment.

The adults appeared during May. The habitat of this form is remarkably restricted. It occurs so far as known only in the Puget Sound region southward to Mount Rainier. Specific localities are:

Nanaimo, British Columbia (Vancouver Island), August 6, 1906 (Dyar & Caudell).

Mission, British Columbia (Fraser Valley), July 14, 1919 (E. Hearle).

Harrison, British Columbia, June 20, 1919 (E. Hearle).

Agassiz, British Columbia, May 23, 1919 (E. Hearle).

Lake Cushman, Washington (Hoods Canal), June 23, 1917 (H. G. Dyar).

Hoodspoint, Washington, July 7, 1920 (H. G. Dyar).

Ashford, Washington (Mount Rainier region), August 1, 1906 (Dyar & Caudell).

***Aedes fitchii palustris* Dyar.**

This species was bred from the same pools that produced *aloponotum*, the *palustris* emerging first. The form accompanies *aloponotum* throughout its distribution, but exceeds it considerably, occurring southward along the mountains to central California, and northward in favorable locations to Alaska.

***Aedes aboriginis* Dyar.**

This species breeds in early snow pools and also, rarely, in dark pools in deep forest, in which location the emergence is much retarded. These larvae in the dark forest pools are much preyed upon by *Eucorethra* larvae, which those in the open pools escape. In some shaded ditch-pools near Bremerton, Washington, belated larvae of *aboriginis* were taken singly at the end of April, 1924.

The distribution of this species is coincident with that of *aloponotum* in its southern extension; but it extends further to the north. It occurs at the foot of Mount Baker and along the coastal region of British Columbia and Alaska, as far as the barrier islands extend, except at the river mouths, where the Canadian fauna pierces through to the coast.

***Aedes cinereus* Meigen.**

This little species pays little attention to the boundaries of faunal regions, but occurs generally throughout forested country. It invades the lower portions of the Pacific coastal area, being found rarely in the Puget Sound region. Larvae were found in the edges of a large lake, half a mile across, near Hoodspout, Washington. In spite of its size, this lake goes completely dry in the summer, and so has the character of a temporary pool.

The *Culex* and *Culiseta* of the region are not so peculiar in their distribution, and have been adequately commented upon previously.

THE AMERICAN FORMS OF *Aedes cinereus* MEIGEN

(*Diptera, Culicidae*)

By HARRISON G. DYAR

In the monograph (Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iv, 729, 1917), we treated the American form of this species as *Aedes fuscus* O. S., but called attention in a footnote to its identity with the European *Aedes cinereus* Meigen. This synonymy has been followed since; but nevertheless, the two forms are not identical. In the European specimens examined by me, at least in the females, the broad scales on the head practically meet vertically, whereas in the American form there is a very distinct channel of narrow scales reaching through to the vertex. The American form, therefore, may be called *Aedes cinereus fuscus* O. S.

The subspecies has a wide distribution in Canada and America, following in the main wooded country, although not reaching to high altitudes or very far north. With this wide distribution, it is never locally abundant. In California, however, a modification occurs. At about the 7,000 foot level, the species takes on a change in coloration and habits, for which I propose the name

***Aedes cinereus hemiteus*, new race.**

The channel of narrow scales on the vertex of head is wider

than in *cinereus fuscus*; the mesonotum is bronzy brown, with two longitudinal black lines and posterior short side stripes; the abdominal bands are variable, often well developed, the lateral widenings touching, but not forming an even lateral band; venter frequently with a more or less distinct median dark band.

Types, five females, Lakes Center Camp, Plumas County, California, June 30-July 1, 1920 (H. G. Dyar). The form was also found in numbers in the valley of the Merced River above 7,000 feet, at Lake Merced and Lake Washburn in June, 1924. The season this year was remarkably early, and adults were on the wing and somewhat worn. Complaint was made by the caretakers at Lake Merced that "a small black mosquito" had been biting about a week before our arrival, which would have been during the last days of May. On June 8 they were no longer biting, but had returned to the meadow, where fed females could easily be flushed from the grass. Males were present in the meadow, all under a single willow bush, which presented no apparent difference from any other willow, yet here were three or four hundred males under this brush and none elsewhere. The females also were in the same vicinity.

The Merced River flows through a solid, glacier-worn, rock bed, and where this bed rises, lakes are necessarily formed. Both Merced and Washburn Lakes are of this character. At the upper end of each lake, the incoming silt has formed a meadow, and the waves beating back against this, have thrown up an elevated beach. Behind this barrier in the low meadow, pools are formed by high water. The peculiar nature of the local breeding places, the large number of specimens occurring where found, the exodus to feed and the marked return home of fed females, all indicate a departure in habits from those of *cinereus fuscus*.

Eggs were obtained from females taken from the meadow, single egg long, fusiform, about five times as long as wide, flattened on one side, shining black.

It is evident that the male which I assigned to *Aedes ventrovittis* (Ins. Ins. Mens., viii, 172, 1920) is this species.

NOTES ON AEDES VENTROVITTIS DYAR

(Diptera, Culicidae)

By HARRISON G. DYAR

Aedes ventrovittis Dyar.*Aedes ventrovittis* Dyar, Ins. Ins. Mens., iv, 84, 1916.*Aedes ventrovittis* Dyar, Ins. Ins. Mens., v, 18, 1917.*Aedes fisheri* Dyar, Ins. Ins. Mens., v, 19, 1917.*Aedes (Heteronycha) fisheri* Dyar (*punctor* group), Ins. Ins. Mens., viii, 105, 1920.*Aedes (Heteronycha) fisheri* Dyar, Ins. Ins. Mens., viii, 169, 1920.*Aedes (Aedes) ventrovittis* Dyar, Ins. Ins. Mens., viii, 172, 1920.*Aedes (Ochlerotatus) fisheri* Dyar, Ins. Ins. Mens., ix, 75, 1921.*Aedes (Heteronycha) fisheri* Dyar, Proc. U. S. Nat. Mus., lxi, 59, 1922.*Aedes (Aedes) ventrovittis* Dyar, Proc. U. S. Nat. Mus., lvi, 94, 1922.

The larva of *ventrovittis* being supposedly unknown in the spring of 1924, I took advantage of information furnished by Professor Stanley B. Freeborn that a large breeding meadow of the species existed at the head of Fletcher Creek in the Yosemite National Park, at an elevation of 9,000 feet. After making the trip from Yosemite Valley to Merced Lake to which I was most kindly assisted by Mr. W. B. Lewis, Superintendent of Yosemite Park, we found yet a long trail to the summit. Merced Lake is at an altitude of 7,200 feet, the remaining 2,000 feet being a steep climb. We undertook this; but when several miles below the summit, *ventrovittis* females appeared and eager to bite. A male was secured, at about 8,000 feet, feeding on the catkins of a small willow bush, which to my surprise, proved to be a male of *fisheri*. Once given this hint, a comparison of the types of *fisheri* and *ventrovittis* established the above synonymy. The color of the mesonotum varies considerably, from brown to light gray, through a greenish gray; there may be fairly distinct brown lines or none.

The larva has been described by me (as *fisheri*). The species breeds by preference at high altitudes, where the pools are kept filled by direct drainage from melting snow. In the Fletcher Creek locality, Professor Freeborn encountered the

adults in thousands. Lower down the breeding is less abundant. At Summit, Placer County, California, 7,000 feet, solitary larvae were found in little pools in a meadow through which snow-water was running. At Lake Tahoe, 6,000 feet, I found a ditch-pool beside a road into which water was running from a melting snowbank on the other side of the road. This pool was dry the next day, and obviously no adults could have emerged. Larvae were brought home to rear; but on adding fresh water to the culture, they all died, the necks extended and the intestines protruding from the anal opening. I transferred them as quickly as possible to their own water, but all died. I have never seen larvae as sensitive to osmosis as these were. The difference between the waters must have been slight. The original pool was filled by melting snow, probably condensed somewhat by evaporation, but perfectly clear. The water at the house was taken from the piped water from a stream supplied by melting snow. In carrying cultures from the collecting ground, it is usual to carry as little water as possible, and then fill up the cultures at home. I have done this hundreds of times without any ill effect; this time it was fatal.

Eggs were obtained from captive females at Merced Lake. Fusiform, about three times as long as wide, flat on one side; shining black. Laid singly. The females oviposited in about five days from time of capture, which is an unusually short period; four weeks is not uncommon as an incubation period.

The adults emerging at the head of Fletcher Creek migrated down from the summit on all sides, to a distance of ten miles or more. Then, after biting, they obviously returned, as the species does not breed at Merced Lake, nor probably on the Tuolumne Meadows on the other side. Breeding is very local in this region, as most of the country is composed of bare granite ledges and dry forest. It is therefore quite easy to observe the habits of the species of mosquitoes present.

SOME NEW MOSQUITOES FROM COLOMBIA—II (*Diptera, Culicidae*)

By HARRISON G. DYAR

In this journal, Vol. xii, pp. 119-124, 1924, I mentioned some new mosquitoes from Colombia collected by Major L. H. Dunn. A badly placed mount deceived me in describing *sursumptor* (page 123); the structure is really the same as in *ligator*, which is correctly described. The following is the synonymy:

Culex (Choeroporpa) sursumptor Dyar.

Culex (Choeroporpa) sursumptor Dyar, Ins. Ins. Mens., xii, 123, 1924.

Culex (Choeroporpa) ligator Dyar, Ins. Ins. Mens., xii, 123, 1924.

The species falls in the place of *inhibitor* D. & K. in the table (Ins. Ins. Mens., viii, 81, 1920). *Inhibitor* itself is wrongly placed, owing to a poor slide. A leaf-like appendage is really present on the outer lobe of the side piece and the species should be placed with *leprincei*, from which it differs in certain details.

Major Dunn has recently sent further collections, of which one is of special interest. The specimens were caught on board the river steamer, "Quibdo," while tied to the bank at Murindo on the Atrato River, between 8 and 10 p. m. Many males of the small species of *Culex* came to the boat, of which the following are noted:

Culex (Microculex) imitator Theobald.

Indicating the presence of epiphytic Bromeliaceae near the shore.

Culex (Aëdinus) amazonensis Lutz.

This little species seems to favor the shores of rivers, but its habits have not been made known. The distribution is wide.

Culex (Melanoconion) dunni Dyar.

We found this species in Panama breeding in the grass along the edge of Gatun Lake. The distribution is now extended, and the species probably reaches Surinam (see Ins. Ins. Mens., xi, 188, 1923).

Culex (Choeroporpa) eastor Dyar.

This little species, described from the coastal region of Surinam, appeared in considerable numbers, 26 specimens being obtained. This both extends the known distribution and gratifyingly augments the material in the collection.

Culex (Choeroporpa) crybda, new species.

Male antennae comparatively short, the end of the penultimate joint not quite reaching tip of proboscis, the last two joints slender, sparsely setose; black, a small whitish mark at base of penultimate joint and middle of long joint. Occiput black scaled, with many erect forked ones, a small white patch on the side next the eye. Mesonotum dark brown. Abdomen black, with basal segmental white bands which are very narrow centrally. Tarsi dark. Wing scales ovate on the forks of the second vein.

Hypopygium. As in *epanastasis* Dyar; the tenth sternites have six instead of ten teeth, and the mesosome is very different, being long, smooth and horn-shaped, with but a single terminal point; a long thorn-like branch at the middle at right angles.

Type, one male.

Culex (Mochlostyrax) colombiensis, new species.

Antennae exceeding the proboscis by the length of the last two joints, which are slender and setose, black. Occiput entirely with flat white scales and small sparse erect forked black ones. Mesonotum brown. Abdomen black above, without bands, dark below. Tarsi dark. Wing scales ligulate on the forks of second vein.

Hypopygium. As in *hesitator* D. & K.; the mesosomal plate has a remarkable double hook at the tip of the apical point on the side where there are two points, wholly lacking in *hesitator*.

Type, one male.

The separation of the species of *Mochlostyrax* can now be improved over that formerly given by me (Ins. Ins. Mens., vi, 107, 1918).

TABLE OF *MOCHLOSTYRAX* BY THE MALE HYPOPYGIUM

Ninth tergites large with long hairs.

Mesosomal plate with long subapical third point.

This point straight, twice as long as outer arm,

caudelli Dyar & Knab

This point curved, about the length of outer arm,

multispinosus Bonne-Wepster & Bonne

Mesosomal plate with short apical third point.....*alogistus* Dyar

Ninth tergites small, hairy.

Mesosomal plate with two points and a long subapical horn,

hesitator Dyar & Knab

The outer point produced into a T-shaped spine...*colombiensis* Dyar

Ninth tergites minute, pointed or rarely appearing rounded; third point of mesosomal plate usually long.....*pilosus* Dyar & Knab

***Culex (Mochlostyrax) caudelli* Dyar & Knab.**

Mochlostyrax caudelli Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 223, 1906.

Described from Trinidad. There is no fresh material before me.

***Culex (Mochlostyrax) multispinosus* Bonne-Wepster & Bonne.**

Culex (Mochlostyrax) multispinosus Bonne-Wepster & Bonne, Ins. Ins. Mens., vii, 177, 1920.

I have no authentic male of this species, the cotype left by Dr. Bonne being a female. However, one of the specimens under *alogistus* differs, and I am supposing this to be *multispinosus*. It seems unlikely that there are more than two *Mochlostyrax* in Surinam. The original description must be in error in describing lateral lobes and also small normal basal ones. Some other structure, I think, has been mistaken for nearly hairless aborted ninth tergites, while the true ninth tergites are well developed as in *caudelli* and *alogistus*.

***Culex (Mochlostyrax) alogistus* Dyar.**

Culex (Mochlostyrax) alogistus Dyar, Ins. Ins. Mens., vi, 126, 1918.

The mesosomal plate ends in three points which are all about the same length. I have this only from Surinam.

Culex (Mochlostyrax) hesitator Dyar & Knab.

Culex hesitator Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 205, 1907.

Known only from Panama. Besides the specimens originally collected by Busck, I have one obtained by Zetek at Matachin, June 29, 1913. The species has not been taken recently.

Culex (Mochlostyrax) pilosus Dyar & Knab.

Mochlostyrax pilosus Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 223, 1906.

Mochlostyrax cubensis Dyar & Knab (not *Culex cubensis* Bigot), Journ. N. Y. Ent. Soc., xiv, 223, 1906.

Mochlostyrax floridanus Dyar & Knab, Proc. Biol. Soc. Wash., xix, 171, 1906.

Mochlostyrax jamaicensis Grabham (not *Culex jamaicensis* Theobald), Can. Ent., xxxviii, 318, 1906.

Culex agitator Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 100, 1907.

Culex deceptor Dyar & Knab, Smith. Misc. Colls., Quart. Iss., lii, 257, 1909.

Culex reductor Dyar & Knab, Smith. Misc. Colls., Quart. Iss., lii, 257, 1909.

Culex mastigia Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iii, 426, 1915.

Culex (Mochlostyrax) curopinensis Bonne-Wepster & Bonne, Ins. Ins. Mens., vii, 177, 1920.

I have this widely spread species from the Antilles, Florida, the Gulf States, Mexico, Costa Rica, Panama, Ecuador and Surinam. As shown by Mr. W. H. W. Komp (Ins. Ins. Mens., xi, 133, 1923), the larvae live in temporary rain-pools, not in permanent water as is usual with *Culex*. Mr. Shannon and the writer found the larvae abundant in surface water following rain in the jungle near Gatun, Canal Zone, associated with *Psorophora cilipes* Fab., *Psorophora posticatus* Wied., *Aedes serratus* Theobald and *Aedes hastatus* Dyar. The larvae fasten themselves by the air-tubes to objects on the bottom of the puddle, and when in a glass jar are seen boring vigorously in an attempt to fasten themselves.

THE AMERICAN SPECIES OF URANOTAENIA

(Diptera, Culicidae)

BY HARRISON G. DYAR AND RAYMOND C. SHANNON

The following table will separate the known species of *Uranotaenia* Lynch Arribalzaga occurring in America:

Tarsi all darkly colored, without white.

Wing scales pale, except in a contrasting stripe on costa.

Wing scales white, the dark stripe on two-thirds of costa; head white *leucoptera* Theobald

Wing scales pale, the dark stripe on whole of costa; head creamy, with dark erect scales..... *hystera* Dyar & Knab

Wing scales dark, with white patches on middle of costa, apex, fifth vein and base of fork..... *nataliae* Lynch Arribalzaga

Wing scales dark, a line of bluish white ones at base of fifth vein.

Mesonotum with median blue marking.

Mesonotal blue a continuous line..... *sapphirinus* Osten Sacken

Blue broken at antescutellar space,

Variety *socialis* Theobald

Mesonotum without median blue marking.

Vertex of head with a blue line on each side, joining the white eye-border *pallidoventer* Theobald

A blue-white spot in center of vertex; no eye-border,

orthodoxa Dyar

Wing scales dark, including those of fifth vein.

Lateral blue line of mesonotum faint or absent, the two segments separated..... *anhydor* Dyar

This line distinct, the anterior segment in a black patch,

syntheta Dyar & Shannon

Tarsi marked with white, especially the hind pair.

All the tarsal joints marked with white at base and apex; mesonotum with median blue marking.

Hind tarsi with fourth and fifth joints white; abdomen with apical segmental triangular spots..... *geometrica* Theobald

Fourth hind tarsal not all white; abdomen with apical white bands on two segments.

Mesonotal blue line continuous,

pulcherrima Lynch Arribalzaga

This line reduced to a dot..... Variety *apicalis* Theobald

Terminal hind tarsals white, but no white at tarsal joints; mesonotum without median blue marking.

Mesonotum with a white marginal line from wing base to anterior edge..... *calosomata* Dyar & Knab

Mesonotum without such a continuous line.

Mesonotum brown, a bluish silvery line from base of wing half way to anterior margin.

Abdomen black above with basal segmental white bands *coatsacoalcos* Dyar & Knab

The segmental white bands obsolete,

Variety *typhlosomota* Dyar & Knab

Mesonotum testaceous, a black spot at wing base, slightly centered with blue scales..... *lowii* Theobald

***Uranotaenia leucoptera* Theobald.**

Anisochelcomyia leucoptera Theobald, Mon. Culic., iv, 575, 1907.

Anisochelcomyia leucoptera Surcouf & Gonzales Rincones, Dipt. Vul. Venez., 99, 1911.

Anisochelcomyia = *Uranotaenia*, Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iv, 898, 1917.

This is the most peculiarly marked species before us. We have specimens from the following localities:

Upper Caroni Ward, Trinidad (J. D. Leacock).

Paramaribo, Surinam (J. Bonne-Wepster).

***Uranotaenia hystera* Dyar & Knab.**

Uranotaenia hystera Dyar & Knab, Ins. Ins. Mens., i, 78, 1913.

This species is allied to *leucoptera*. Our material is as follows:

Manao, Orinoco, Venezuela (F. L. deVerteuil).

Garrapata, Colombia, February 19, 1922 (F. A. Miller).

***Uranotaenia nataliae* Lynch Arribalzaga.**

Uranotaenia nataliae Arribalzaga, Rev. Mus. de La Plata, ii, 164, 1899.

Uranotaenia nataliae Theobald, Mon. Culic., ii, 252, 1901.

Pseudouranotaenia rowlandii Theobald, Journ. Econ. Biol., i, 33, 1905.

Pseudouranotaenia rowlandii Theobald, Mon. Culic., iv, 567, 1907.

Pseudouranotaenia = *Uranotaenia* Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iv, 898, 1917.

Uranotaenia noctivaga Neiva & Pinto, Brazil Medico, xxxvi, No. 49, 374, 1922.

Lynch's description is not very definite about the wing-spottings; Theobald compiles it as "wing scales blue in places." We think that no other species can be intended.

Upper Caroni Ward, Trinidad (J. D. Leacock).
Georgetown, British Guiana (Dr. Rowland).
Paramaribo, Surinam (J. Bonne-Wepster).
Buenos Aires, Argentina, December, 1921 (J. Petrocchi).

***Uranotaenia anhydor* Dyar.**

Uranotaenia anhydor Dyar, Proc. U. S. Nat. Mus., xxxii, 128, 1907.

Uranotaenia anhydor Dyar, Ins. Ins. Mens., iv, 50, 1916.

Uranotaenia anhydor Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iv, 926, 1041, 1917.

This species is not yet known outside of southern California, the specific localities being given in the Monograph.

***Uranotaenia syntheta*, new species.**

Head black scaled on the vertex, a narrow white border behind the eyes; mesonotum testaceous, the sparse dark scales forming longitudinal lines; a blue line along the lateral margin, the segment next the wing root without distinct border, the anterior segment surrounded by a distinct black patch; a blue line on prothoracic lobe, in line with one on the pleura. Wing scales all dark, including those on the base of the fifth vein. Abdomen black above, paler below, without markings. Tarsi all dark.

Type, female, Mission, Texas, April 15, 1924 (R. L. Turner).

We wished to dedicate this species to Mr. Turner, on account of his intelligent interest and indefatigable collecting in the lower Rio Grande Valley; but he urged us to name it after Mr. R. E. Tarbett, his chief in the Public Health Service, whose liberal policy in encouraging the inspectors to become acquainted with the species of mosquitoes in addition to routine extermination work gave Mr. Turner the opportunity to make this discovery. The embarrassment of choice thus forced on us has induced us to give the insect a non-committal name.

***Uranotaenia pallidoventer* Theobald.**

Uranotaenia pallidoventer Theobald, Mon. Culic., iii, 300, 1903.

Uranotaenia pallidoventer Surcouf & Gonzales Rinocones, Dipt. Vul. Venez., 94, 1911.

Our material is all from one collector:
Paramaribo, Surinam, 1916 (J. Bonne-Wepster).

***Uranotaenia orthodoxa* Dyar.**

Uranotaenia orthodoxa Dyar, Ins. Ins. Mens., ix, 118, 1921.

No material of this species has been received since the description:

Tiribi, Costa Rica, May 29, 1921 (A. Alfaro).

San José, Costa Rica, May 15, 1920 (A. Alfaro).

***Uranotaenia sapphirinus* Osten Sacken.**

Aedes sapphirinus Osten Sacken, Trans. Am. Ent. Soc., ii, 47, 1868.

Uranotaenia socialis Theobald, Mon. Culic., ii, 340, 1901.

Uranotaenia coquilletti Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 186, 1906.

Uranotaenia sapphirinus and *socialis* Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iv, 901, 905, 1917.

The form *socialis*, with the median mesonotal blue line broken, we consider to be of not more than varietal rank.

United States, from New Hampshire to Florida and the Gulf region.

Havana, Cuba, May 10, 1903 (J. R. Taylor).

Saint Thomas, Virgin Islands, August, 1905 (A. Busck).

Kingston, Jamaica, April, 1906 (M. Grabham).

***Uranotaenia geometrica* Theobald.**

Uranotaenia geometrica Theobald, Mon. Culic., ii, 247, 1901.

Uranotaenia geometrica Surcouf & Gonzales Rincones, Dipt. Vul. Venez., 96, 1911.

Uranotaenia geometrica Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iv, 918, 1917.

A common species in the rainy season in Panama and Costa Rica. We have material also from:

Trinidad (F. W. Urich).

Georgetown, British Guiana, September 18, 1905 (Dr. Rowland).

Paramaribo, Surinam (J. Bonne-Wepster).

***Uranotaenia pulcherrima* Lynch Arribalzaga.**

Uranotaenia pulcherrima Arribalzaga, Rev. Mus. de La Plata, ii, 165, 1891.

Uranotaenia apicalis Theobald, Mon. Culic., iii, 298, 1903.

Uranotaenia pulcherrima Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iv, 908, 1917.

We have but three specimens of this species, which ranges from Argentina and Brazil to the Lesser Antilles:

Georgetown, British Guiana (H. W. B. Moore).

Murindo, Colombia, 1924 (L. H. Dunn).

***Uranotaenia calosomata* Dyar & Knab.**

Uranotaenia calosomata Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 200, 1907.

Uranotaenia calosomata Surcouf & Gonzales Rincones, Ess. Dipt. Vul. Venez., 98, 1911.

Uranotaenia calosomata Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iv, 922, 1917.

Uranotaenia calosomata var. *albitarsis* Gordon & Evans, Ann. Trop. Med. & Par., xvi, 335, 1922.

The variety *albitarsis* from Brazil may be considered a synonym, as we consider it only a question of the terms used to describe the peculiar color of the fore and mid tarsi, whether it be called "creamy white" or a strong "brassy luster."

Tabernilla, Canal Zone, Panama (A. Busck).

Barranquilla, Colombia, 1923 (L. H. Dunn).

***Uranotaenia coatzacoalcos* Dyar & Knab.**

Uranotaenia coatzacoalcos Dyar & Knab, Journ. N. Y. Ent. Soc., xiv, 186, 1906.

Uranotaenia typhlosomata Dyar & Knab, Journ. N. Y. Ent. Soc., xv, 200, 1907.

Uranotaenia coatzacoalcos, *basalis* and *typhlosomata* Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iv, 916, 917, 924, 1917.

Uranotaenia coatzacoalcos Dyar, Ins. Ins. Mens., xi, 71, 1923.

The coloration of the abdomen varies, having basal segmental white bands or none, a very good gradation being before us from the same localities. The white marking is often distinct in northern specimens, but all of those from southern localities are of the *typhlosomata* variety. The species ranges from southern Mexico to Trinidad. Some new records are as follows:

- Villalobos, Costa Rica, February 16, 1921 (A. Alfaro).
 Tiribi, Costa Rica, February 11, 1921 (A. Alfaro).
 Escasú, Costa Rica, February 7, 1921 (A. Alfaro).
 Itiquis, Costa Rica, April 12, 1921 (A. Alfaro).
 Alajuela, Costa Rica, April, 1922 (A. Alfaro).
 Gatun, Canal Zone, Panama, August, 1912 (J. Zetek).
 Barro Colorado Island, Gatun Lake, Canal Zone, Panama,
 June 25, 1923 (R. C. Shannon).
 Belmont, Trinidad (J. Leacock).

***Uranotaenia lowii* Theobald.**

- Uranotaenia lowii* Theobald, Mon. Culic., ii, 339, 1901.
Uranotaenia continentalis Dyar & Knab, Journ. N. Y. Ent. Soc.,
 xiv, 186, 1906.
Uranotaenia minuta Theobald, Mon. Culic., iv, 559, 1907.
Uranotaenia lowii and *continentalis* Howard, Dyar & Knab, Mosq.
 No. & Cent. Am. & W. I., iv, 911, 914, 1917.

Southern United States to Brazil; a very small species, but widely distributed. The following are new records:

- Paramaribo, Surinam (J. Bonne-Wepster).
 Puerto Niño, Colombia, February 21, 1922 (F. A. Miller).
 Arenal River, Canal Zone, Panama, March 1, 1923 (J. B. Shropshire).
 Frijoles, Canal Zone, Panama, July 28, 1923 (Dyar & Shannon).
 Merida, Yucatan, July 15, 1921 (M. E. Connor).
 Miami, Florida, December 13, 1921 (G. F. Mozzette).
 Brewton, Alabama, September 22, 1922 (W. H. W. Komp).
 Mound, Louisiana (G. H. Bradley).

NOTE ON THE LARVA OF THYRIS MACULATA

(*Lepidoptera, Thyrididae*)

By HARRISON G. DYAR

Six species of Thyrididae are known in the United States, contained in five genera. Of these, *Hexeris*, *Meskea* and *Thyridopyralis* are gall-makers as larvae, *Dysodia* lives in rolled leaves, while the larvae of *Thyris* are unknown. The European

Thyris are said to live in rolled leaves (See Hofmann, "Die Raupen der Gross-Schmetterlinge Europas," 34, 1893). I am now able to confirm this for one American species.

***Thyris maculata* Harris.**

The larva lives on Clematis, and may be found fully grown in August. The case is made by cutting a slit parallel to the margin of the leaf, near the margin for young larvae, near the center of the leaf for large ones. The larva rolls the leaf as it cuts and spins it fast by the inner margin so that a spreading roll is formed, open below. The larva rests in the top part of this retreat.

The larva is thick and stout, light orange color, with large round black tubercles, iv, and v setae on one tubercle. Head orange-red, the mouth parts scarcely darker. Cervical shield large, orange, with a black patch on each side and at the lower edge. Thoracic feet and anal plate black.

Larvae from Washington, D. C., on a clematis vine in my back yard.

**SOME NEW SPECIES OF AMERICAN DIXA
MEIGEN**

(*Diptera, Culicidae*)

By HARRISON G. DYAR AND RAYMOND C. SHANNON

***Dixa thones*, new species.**

Rather large species with cloud on the cross-vein and clouded between cubital and anal veins. Basal antennal joints dark dorsally, yellowish ventrally; clypeus yellowish brown. Mesonotum bright yellow on lateral margins, with three dark brown longitudinal stripes; space between the posterior stripes and scutellum yellowish brown. Metanotum yellowish brown. Legs yellowish; femora and tibiae darkened apically; tarsi darkened. Radial sector as long as petiole of R_2 and R_3 ; M_3 longer than distance between tips of forks of media; sc-r cross-vein midway between base of R and forking of R_4 ; Cu_1 slightly curved downward.

Male hypopygium. Eighth segment completely chitinized but setose, narrowed ventrally. Aedoeagus with strong triangular base, elongate in wire-form, looped and occupying portions of the three preceding segments. Side-pieces convex outwardly, chitinized, infuscated; the apical lobe long, triangular at base, bent beyond middle, the tip rounded and with a small accessory branch at the angle, smooth, setose only near base; basal lobe long, finger-shaped, setose at the tip. A basally directed long horn-like prominence at base of side-piece. Clasper stout, setose, rounded at tip; an angular projection inwardly bearing three spines above and a group of setae below.

Much as in *californica* Johannsen, but the basal lobe of side piece is double as long.

Types, two males, No. 27415, U. S. Nat. Mus.; Longmire Springs, Washington, June 14, 1917 (H. G. Dyar); August 2, 1905 (J. M. Aldrich). Also 12 other specimens from the same locality and collectors.

Dixa hegemonica, new species.

Rather large species with yellow mesonotum and dark stripes; wing veins strongly marked; a cloud on r-m cross vein between cubitus and anal vein. Sc-r cross vein midway of base of R and forking of R_{4+5} . M_3 as long as distance between its tip and tip of M_{1+2} . R-m joining R_{4+5} ; base of R_5 distad of tip of Sc. Legs yellowish, tips of femora and tibiae darkened, knobs of halteres yellowish.

Male hypopygium. Eighth segment enlarged, chitinized, infuscated. Aedoeagus very long, dark at the base, terminating in a long pale string that is seen curling in the last three segments preceding the eighth. Side pieces stout, chitinized, infuscated, convex without; apical lobe double, furcate at right angles, both arms sparsely setose, the longer one only so densely at the tip; basal lobe broad, with a notch at one side of tip. Clasper parallel sided, a little widened at tip with a point outwardly, sparsely setose. Ninth tergites conical, large, densely setose, with coarse setae on one margin.

Not allied to any species known to us in the male.

Type, male, No. 27446, U. S. Nat. Mus.; Eureka, California, May 25, 1903 (H. S. Barber).

***Dixa somnolenta*, new species.**

Fairly large yellowish species with clear wings. Basal antennal joints blackish dorsally, yellowish ventrally; clypeus yellow; head between the eyes blackish with yellow eye-margins. Lateral margins of mesonotum yellow, darker on disk, with three brown longitudinal stripes; scutellum and metanotum yellowish. Legs yellowish, apices of tibiae blackish; tarsi darkened. Sc-r cross vein before middle of base of R and forking of R_1 . R_4 longer than petiole of R_2 and R_3 . M_3 slightly longer than distance between its tip and tip of M_{1+2} . Halteres yellowish.

Male hypopygium. Eighth segment not chitinized. Aedoeagus short, but with a pair of strong curved chitinized basal pieces. Side piece thick, convex, not infuscated; apical lobe curved, twisted, horn-like, bare except for a few setae at base, strongly infuscated; basal lobe widened fan-shaped, excavate in the middle, densely and strongly setose; a long slender smooth hooked process from the base of the side piece. Clasper thick, triangularly widened to a flat tip, infuscated outwardly, a point on outer margin of tip, and strong setae on the inner angle; a triangular laminate horn arising near middle of clasper and exceeding its tip, the whole clasper setose. Ninth tergites broad, membranous, finely setose.

Allied to *cornuta* Johannsen, differing in detail in the basal lobe of side piece and in the clasper.

Type, male, No. 27447, U. S. Nat. Mus.; Viola, Idaho, August 21, 1912 (J. M. Aldrich). Also two females from same place and collector.

***Dixa xavia*, new species.**

Fairly large brownish species with cloud on r-m cross vein and basal half of An cell. Basal joints of antennae and clypeus brown. Thorax brown, somewhat lighter on lateral margins of mesonotum and before scutellum; scutellum yellowish. Legs yellowish brown, tibiae a little darker apically. Sc-r cross vein before the middle of radius from its base to fork of R_5 . R_4 shorter than petiole of R_2 and R_3 . M_3 longer than distance

between its tip and tip of M_{1+2} . Wing veins strongly marked. Halteres pale, the knobs yellowish brown.

Male hypopygium. Eighth segment chitinized, but narrow, widely open on the dorsal (functional ventral) side. Side piece short, stout, conical; apical lobe triangular, short, setose at tip; basal lobe large, roundedly expanded and a little excavate at tip, with short stout setae on the inner basal angle. Aedoeagus short, but with a strong rectangular basal bridge. Clasper broad, parallel sided and round ended, narrowed at base, finely setose, the setae stouter on inner margin. Tenth sternites projecting inwards at right angles from base of side piece, sharply pointed, straight, triangularly widened at base, chitinized and dark. Ninth tergites large, cone-shaped, densely and shortly setose.

Not closely allied to any species of which we know the male.

Type. male. No. 27448, U. S. Nat. Mus.; Los Gatos, California, February 16, 1906 (J. M. Aldrich).

This is possibly the species which Johannsen records from California as *modesta* Joh.

Dixa nocheles, new species.

Medium sized species, rather dark brown, with cloud on r-m cross vein and basal half of 1st An cell. Antennae and clypeus brownish; mesonotum brownish, with three darker longitudinal stripes. Sc-r cross vein midway of subcosta. R_4 shorter than petiole of R_2 and R_3 . M_3 a little longer than width of cell M_{1+2} . Veins strongly marked. Legs brownish, femora and tibiae darkened apically.

Male hypopygium. Eighth segment moderately chitinized and darkened, narrow ventrally, open dorsally. Aedoeagus small, with Y-shaped bridge. Side piece about twice as long as wide, convex. Outer lobe long, reaching the middle of clasper, smooth, double tipped; inner lobe short, conical, with setae at tip. Clasper parallel sided, rather broad, the end rounded, a little finger-shaped notch on the outer side. Tenth sternites long and stout, horn shaped. Ninth tergites short, conical, setose.

Not closely allied to any species of which the male is before us.

Biscayne Bay, Florida, without date, but evidently from Mrs. Slosson's early collecting (A. T. Slosson).

***Dixa rhathyme*, new species.**

Rather large brownish species with cloud on r-m cross-vein and basal half of 1st An cell. Antennae brownish. Mesonotum brown, with three darker longitudinal stripes. Scutellum light brown. Legs yellowish brown faintly darker on tips of femora and tibiae. Sc-r cross-vein distinctly before middle of subcosta; R_s shorter than petiole of R_1 and R_2 ; M_3 a little longer than width of cell M_{1+2} . Veins fairly dark; halteres brownish.

Male hypopygium. Eighth segment forming a rather narrow chitinous band, widening dorsally and open there. Aedoeagus short, the basal bridge apparently cleft mesially. Side piece short, conical; apical lobe projecting at right angle, tapering to a small upturned tip, setose on the apical aspect; basal lobe slightly exceeding the apical one, conical setose at tip. Tenth seternites arising from inner angles of base of side piece, triangular, tapering to a small tip, rather weakly chitinized. Ninth tergites small, double, one lobe small, the other delicately finger-shaped. Clasper parallel sided, obliquely truncate at tip, the point on the inner angle.

Apparently allied to *modesta* Joh.; but as Johannsen describes only the extreme tip of the structures, detailed comparison is impossible as no specimens of *modesta* are at present before us.

Type, male, No. 27450, U. S. Nat. Mus.; Glacier, Washington, June 4, 1917 (H. G. Dyar). Also 9 other specimens from same locality and collector.

***Dixa mystica*, new species.**

Rather small brownish species with clear wings. Antennae and clypeus brownish. Mesonotum brown, the longitudinal stripes hardly distinct. Scutellum and metanotum pale brown. Legs brown. Sc-r cross-vein distinctly before middle of subcosta. R_s shorter than petiole of R_2 and R_3 ; cell M as broad as cell R. Halteres brownish. Mid sterno-pleural setae arranged one anteriorly, five or six posteriorly.

Male hypopygium. Eighth segment forming a narrow chitinous band, widening dorsally. Aedoeagus small and without

conspicuous basal supports. Side piece about twice as long as wide, convex without; apical lobe projecting at right angles, conical, with rounded tip and setose there; basal lobe similar, flatly expanded, setose. Clasper furcate, the long arm rounded, setose, the short inner one with only three setae from distinct tubercles. Tenth sternites from inner base of side piece, horn-shaped, moderate, at right angles. Ninth tergites small, divided, two finger-shaped setose processes at right angles.

This species has been commonly confused with the following (*inextricata*), both being indiscriminately labelled "*Dixa fusca* Loew" in the material before us.

Types, two males, No. 27451, U. S. Nat. Mus.; Cabin John, Maryland, February 22, 1915 (R. C. Shannon); Difficult Run, Virginia, October 3, 1915 (W. L. McAtee), both localities being on the Potomac River above Washington. Also five other specimens from the same and adjoining localities.

***Dixa inextricata*, new species.**

Rather small brownish species with clear wings. Antennae and clypeus brownish. Mesonotum brownish, the longitudinal markings a little darker; scutellum pale brown. Coxae yellowish, legs brown, hind tibiae darkened apically. Sc-r cross-vein before middle of subcosta; R_4 as long as petiole of R_2 and R_3 ; cell R noticeably broader than cell M. Halteres brownish. Mid sternal setae only one, just behind middle.

Male hypopygium. Eighth segment narrow, scarcely more chitinated than the other segments. Aedoeagus small, without strong basal supports. Side piece not twice as long as wide, convex without; apical lobe small, at right angles; setose on apical aspect; basal lobe similar, stouter and blunter ended, setose. Clasper triangular, straight without, bulging within, round ended, the setae on the inner margin stout and spine-like, short. Tenth sternites a small horn from base of side piece. Ninth tergites slender, finger-shaped, rather long, from broader conical base.

This may be *Dixa fusca* Loew; but without a more minute examination of specimens from the type locality than has been

possible to us, we are unable at present to decide the point. *Dixa fusca* was described from New York.

Types, six males, No. 27452, U. S. Nat. Mus.; Dead Run, Fairfax County, Virginia, March 25, 1914 (R. C. Shannon); Plummers Island, Maryland, May 14, 1914 (R. C. Shannon); Cabin John, Maryland, February 22, 1915 (L. O. Jackson). Also many other specimens from the same and adjoining localities, this being the commonest *Dixa* along the Potomac River above Washington.

***Dixa blax*, new species.**

Rather small pale brownish species with clear wings. Antennae and clypeus brown. Mesonotum pale brown, with longitudinal stripes scarcely differentiated. Lower part of pleurae and coxae yellowish. Legs brownish, hind tibiae a little darkened apically. Sc-r cross vein well before middle of subcosta; cell M a little broader than cell R. Halteres pale brown.

Male hypopygium. Eighth segment rather narrow, widened and widely open dorsally, about as heavily chitinized as the side pieces. Aedoeagus short, but rod-shaped and over four times as long as wide, with a broad bridge from the side pieces, cleft in the middle. Side piece short, conical, not twice as long as wide; apical lobe at right angles, short, setose; basal lobe flattened, excavate basally, setose. Clasper rather broad, slightly tapering to a rounded tip, setose. Horn-shaped process from inner base of side-piece (tenth sternites?) produced as a supporting band to base of aedoeagus, terminating rounded and bent. Ninth tergites slender, long, finger-shaped, setose.

With the following (*arge*) apparently near *similis* Joh., as well as we can judge from Johannsen's description of the tip of the hypopygium only.

Type, male, No. 27453, U. S. Nat. Mus.; Bright Angel, Arizona, May 10, 1903 (H. S. Barber).

***Dixa arge*, new species.**

Medium sized pale brown species with faint cloud on r-m cross-vein. Basal antennal joints brownish above, yellowish

below; clypeus brown; mesonotum yellowish brown, with three dark brown longitudinal stripes. Coxae pale brown, legs brownish, femora and tibiae darkened at extreme apices. Sc-R cross vein before middle of subcosta; R_1 about two thirds length of petiole of R_2 and R_3 . Halteres pale, pale brown apically.

Male hypopygium. Eighth segment with chitinous band, narrowed ventrally, widely open dorsally, where normal integument supervenes. Aedoeagus short, rod-shaped, with strong basal bridge, cleft mesially. Side piece not twice as long as wide, conical, with long hairs outwardly; apical lobe moderate, at right angles, with setae at the tip; basal lobe similar in length, roundedly expanded at tip, setose. Clasper slender, conical, tapering to a rounded tip, on the outer side of extreme tip the setae have prominent bases. Tenth sternites with long slender horn, above which is a short lobe and a triangular projecting chitinous horn. Ninth tergites conical, setose, the base enlarged.

Type, male, No. 27454, U. S. Nat. Mus.; Longmire Springs, Washington, June 14, 1917 (H. G. Dyar). A second male from the same locality and collector, was bred.

Dixa (Dixella, new subgenus) lirio, new species.

Small shining black species with unspotted wings. M-cu cross vein obsolete. Head black; clypeus yellowish; last palpal joint one-third longer than preceding joint; mesonotum shining black, edged with an indefinite yellowish stripe; legs yellowish, middle and hind femora blackish apically; all tibiae darkened apically; all claws pectinated. Petiole of R_2 slightly longer than the forks; abdomen pale, eighth segment black. Length, 2.5 mm.

Male hypopygium. Eighth segment chitinized and infuscated all around, the infuscation less dorsally, where the ring is a little wider. Aedoeagus invisible. Side piece obliquely conical. Wider than long, infuscated and minutely setose besides a few normal large setae outwardly; only one lobe, a long angular structure, reaching middle of clasper, a seta at each angle, the tip curved over. Clasper longer than side piece, infuscated, conical, with rounded tip. Tenth sternites flattened,

thin, with darker margins, projecting normally, with two spines at the tip. Ninth tergites a pair of long inflated tubes, finely setose at base, the tip with angular ridges, and just before it a ridge shaped like a dormer window, its margin roughened by a few tubercles.

A very distinct species, for which the subgeneric name *Dixella* is proposed.

Type, male, No. 27455, U. S. Nat. Mus.; Monte Lirio, Canal Zone, Panama, September, 1923 (Dyar & Shannon).

The genus *Dixa* may be subdivided into the following subgenera; besides *Dixella* above mentioned, *marginata* Loew seems also separable on the characters indicated below, and for this we propose the subgeneric name *Dixapuella*.

TABLE OF SUBGENERA OF DIXA MEIGEN

Wings with anterior and posterior margins straight, parallel; hind margin excised between forks of cubitus; anterior margin strongly infuscated	<i>Dixapuella</i> Dyar & Shannon
Wings with hind margin gently rounded, not excised, nor infuscated on anterior margin.	
M-Cu cross-vein present.....	<i>Dixa</i> Meigen
M-Cu cross-vein obsolete.....	<i>Dixella</i> Dyar & Shannon

THE AMERICAN CHAOBORINAE

(*Diptera, Culicidae*)

BY HARRISON G. DYAR AND RAYMOND C. SHANNON

The interest which followed the discovery of the role of mosquitoes in the transmission of disease, and which resulted in their intensive study after the year 1900, did not affect the present subfamily of non-biting Culicidae. Very little attention has been paid to the American non-biting forms, the Chaoborinae and Dixinae. We consider that these three groups belong to a single family on account of the peculiar venation which is common to them all and does not exist elsewhere in the Diptera. The differences between these subfamilies appear in tabular form as follows:

SUBFAMILIES OF CULICIDAE

- A1. Eyes reniform; flagellum 13-jointed; proboscis extending far beyond clypeus; mesosternum ridged; lateral sclerite of metasternum triangular, in line with (Megarhinini, Sabethini) or below (Uranotaenini, Anophelini, Culicini) the base of hind coxa; wings scaled, hind margin with fringe of scales; R_s forking far before tip of Sc; upper squama bare or ciliated.....*Culicinae*.
- A2. Eyes more or less emarginated on mesal line; flagellum 13-jointed; proboscis extending but little beyond clypeus; mesosternum without ridge; lateral sclerite of metasternum much reduced, not triangular; wings with hair-like scales, hind margin with fringe of scales; R_s forking far before tip of Sc; upper squama ciliated.*Chaoborinae*.
- A3. Eyes not emarginated, nearly circular in outline; flagellum 14-jointed; proboscis not extending beyond clypeus; mesosternum without ridge; lateral sclerite of metasternum much reduced, not triangular; wings with only inconspicuous hairs on veins, hind margin with fringe of sparse hairs; R_s forking approximately opposite tip of Sc; upper squama bare.....*Dixinae*.

The species of Chaoborinae in North America are comparatively few. Two, and perhaps more, are also found in northern Europe, and the distribution of the species is in general wide. The immature stages are aquatic, in the larval stage predaceous. The species are of little economic importance, for although all the species are predaceous as larvae, and will eat mosquito larvae, still their diet is not confined to these, and many species, especially those occurring in abundance, frequent large ponds and lakes where no mosquito larvae occur. Prof. C. Juday has found the larvae of *Chaoborus* (*Corethra*) in lake water at a depth of fifteen meters where anaerobic conditions prevail.

The material in the National Museum was fortunately supplemented by that of Dr. J. M. Aldrich. His collection contained authentic specimens of several of the species described by Dr. E. P. Felt. Mr. C. W. Johnson has kindly given us a specimen of his *Chaoborus albatus*.

In general characters the Chaoborinae are:

Very small to rather large, pale to dark species, with or without markings; with hair-like scales on wings and fringe on hind margin of wing.

Eyes more or less reniform; antennae fifteen-jointed (flagellum thirteen-jointed); palpi five-jointed; proboscis very short; clypeus usually long and densely setose; pronotal setae few and usually near upper margin; prealar, mid and lower sternopleural setae present, rarely absent.

Type genus of subfamily, *Chaoborus* Lichenstein (Wiedemann's Arch. Zool., I, 174, 1800).

The type of *Corethra* is *Tipula culiciformis* De Geer, being the only species included by Meigen in proposing the name *Corethra*. Edwards (Ent. Mo. Mag., lvi, 265, 1920), however, says: "Coquillett, and those who follow him, overlook one all-important fact. In his later work Meigen indicates that he did not know *T. culiciformis*, and therefore we must assume that at the time he first described *Corethra* he had another species under De Geer's name. No doubt this insect was the one he later described as *C. lateralis*, which is a synonym or variety of *C. crystallinus*."

It appears to us that these assumptions are unnecessary. Meigen's description is obviously based upon De Geer's figure, since, as he admits, he did not have specimens of the species. His description is as follows:

"*Corethra*. Die Fühlhörner vorgestreckt, vierzehnnigliedrig; bei dem Männchen büschelförmig behaart; bei dem Weibchen borstig. Die Flügel flach parallel, haarig."

So good an entomologist as Meigen would not have adduced as a generic character "wings flat, parallel" from an actual specimen. That is the appearance given in De Geer's figure, but is an attitude seldom assumed in a cabinet specimen. Fourteen joints to the antennae is the number shown in De Geer's figure, who, however, describes and figures only the male. Meigen's addition of "bristle-shaped in the female" for the antennae may have been adduced from the general rule in the family. The peculiar short joint in the tarsi is not shown in

De Geer's figure, the joints being indefinitely drawn, to as many as eight.

In the "Syst. Besch. Europäischen zweifl. Ins." Meigen uses *Corethra* for *crystallina* and *pallida*, including *culiciformis* as unknown to him; but this has no bearing on the original designation of type.

TABLE OF GENERA OF CHAOBORINAE

Anal vein ending basad of fork of cubitus.....*Eucorethra*

Anal vein ending beyond fork of cubitus.

Basitarsal joint shorter than following joint.....*Corethra*

Basitarsal joint longer than following joint.

Tip of R_1 much nearer tip of R_2 than to Sc*Chaoborus*

Tip of R_1 much nearer tip of Sc than to R_2*Corethrella*

Genus *Eucorethra* Underwood

Eucorethra Underwood, Science, p. 182, Aug. 7, 1903.

Pelorempis Johannsen, Bull. 68, N. Y. State Museum, p. 402, 1903.

Eucorethra Coquillett, Canad. Ent., p. 273, 1903.

Unusually large species with mottled wings. Antennae distinctly shorter than fore femur; clypeus as long as the two visible basal palpal joints; dorsal prothoracic sclerite present in both sexes; setose; setae present on upper margin of pronotum (proepimeron); prealar setae absent; midsternopleural setae present; upper mesepimeral setae numerous; marginal scutellar setae arranged in several irregular rows; basitarsal joints longer than their following joints; R_1 ending at tip of wing; crossveins beyond middle of wing; m-cu crossvein as long as basal section of Cu_1 ; anal vein ending before base of cell Cu_1 .

Eucorethra underwoodi Underwood.

Eucorethra underwoodi Underwood, Science, p. 182, Aug. 7, 1903.

Pelorempis americana Johannsen, Bull. 68, N. Y. State Museum, p. 402, 1903.

Eucorethra underwoodi Coquillett, Canad. Ent., p. 273, 1903.

This genus contains only one species which is of widespread northern distribution. The larvae are predaceous with short air-tube, lying flat near the surface of the water, and are found in cold springs or small pools of clear water usually in deep woods, sometimes in rain water barrels, not in open sunlit

pools. They are very destructive to mosquito larvae. In the spring, they are often abundantly supplied with food by the larvae of the early emerging *Aedes*. Later larvae must wait the chance oviposition by *Culiseta*. The senior author has often observed belated *Eucorethra* larvae thus patiently waiting in otherwise empty woods-pools. Clasp of male genitalia with claw; tenth sternites shaped as in *Corethra culiciformis*, but pale and inconspicuous.

DISTRIBUTION IN AMERICA

New York: Saranac Lake, June, 1900 (J. G. Needham).

Plattsburg, August, 1905 (H. G. Dyar).

Elizabethtown, June 9, (E. P. Felt).

Maine: Penobscot County, March 1, 1903 (W. L. Underwood).

Poland Spring, May 15, 1924 (R. C. Shannon).

New Hampshire: Dublin, May 15 (A. Busck).

Crawfords (A. T. Slosson).

Ontario: White River, June 20, 1918 (H. G. Dyar).

Alberta: Banff, July 21, 1918 (H. G. Dyar).

British Columbia: Prince Rupert, May 31, 1919 (H. G. Dyar).

Kaslo, June 23, 1903 (H. G. Dyar).

Montana: Two Medicine Lake, July 7, 1921 (H. G. Dyar).

Washington: Lake Cushman, June 21, 1917 (H. G. Dyar).

Hoquiam, May 27, 1917 (H. G. Dyar).

Olympia, March 31, 1894.

Oregon: Prospect, June 20, 1921 (H. G. Dyar).

California: Fallen Leaf Lake, Lake Tahoe, June 18, 1916 (H. G. Dyar).

Yosemite, May 15, 1916 (H. G. Dyar).

Genus *Corethra* Meigen

Corethra Meigen, Illig. Mag. II, 260, 1803.

Mochlonyx Loew, Ent. Zeit. Stett., 121, 1844.

Medium sized species, reddish-brown or dark brown, with or without wing spots. Antennae shorter than fore femur; clypeus shorter than first (second actual) palpal joint; dorsal prothoracic sclerite present in female, setose; scutellar marginal setae in two or more irregular rows; upper proepimeral, prealar, mid-

sternopleural and upper mesepimeral setae present; basitarsal joint much shorter than second joint; R_1 joining margin of wing nearly at its tip; cross veins placed slightly basad of middle; Cu_1 cell long, narrow; tip of Cu_2 curving forward and running parallel with wing margin for a noticeable distance before entering wing margin, sometimes evanescent without entering wing margin; a tuft of setae on upper side of wing at juncture of the upper squama and alar lobe. Clasp of male genitalia with claw.

The larvae of this genus possess a breathing tube, the thorax is greatly swollen and contains a pair of air sacs, and there is another pair posteriorly in the abdomen (Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., i, Plate viii, facing p. 168, fig. 3, 1912).

KEY TO THE SPECIES OF CORETHRA

Wing vestiture entirely pale yellow.

Scutellar setae numerous, arranged in 2-3 irregular rows; male with anal cell broader than length of scales in marginal fringe,
culiciformis De Geer

Scutellar setae sparse, arranged in single row; male with anal cell not broader than length of scales in marginal fringe,
fuliginosus Felt

Wing vestiture black and yellow.

General color yellowish-brown.....*cinctipes* Coquillett

General color dark gray.....*cinctipes obscura* new variety

Corethra culiciformis De Geer.

Tipula culiciformis De Geer, Mem. pour. serv. a l'hist. d. Ins., vi, 372, 1776.

Corethra velutina Ruthe, Isis, xi, 1205, 1831.

Corethra effoetus Walker, Ins. Brit. Dipt. iii, 252, 1856.

Corethra karnerensis Felt., N. Y. State Museum Bull. 79, 347, 1904.

Corethra lintneri Felt, N. Y. State Museum Bull. 79, 553, 1904.

Medium sized species, 5.5 mm., dark brown (male) to reddish-yellow (female); male with penultimate flagellar joint longer than last joint and more than twice the length of preceding joint; female with last joint slightly longer than preceding joint and about one-fourth longer than antepenultimate joint; wings unspotted; legs yellowish, the tarsi slightly brownish;

vestiture entirely pale yellow; two to three rows of marginal setae; wing of male but little narrower than wing of female. Male with black elongate tenth sternites, curved apically, apex rather sharply pointed.

Corethra culiciformis De Geer will probably prove to be holarctic in distribution. In North America it is apparently confined to the Canadian and Transitional zones. The larvae are usually found in small woodland pools but sometimes occur in more or less stagnant water.

DISTRIBUTION IN AMERICA

New York: Plattsburg, August 11, 1905 (H. G. Dyar).

Karner, June, 1902 (E. P. Felt; recorded as *karnerensis* Felt).

Elizabethtown, June 9, 1904 (E. P. Felt; recorded as *littneri* Felt).

Massachusetts: Springfield (F. Knab).

New Hampshire: Franconia (A. T. Slosson).

Dublin, May (A. Busck).

South Newbury (H. G. Dyar).

Alberta: Banff, June, 1918 (H. G. Dyar).

British Columbia: Kaslo, June, 1903 (H. G. Dyar).

Yukon Territory: White Horse, July, 1919 (H. G. Dyar).

Colorado: Grand Lake, June, 1923 (H. G. Dyar).

Corethra fuliginosus Felt.

Corethra fuliginosus Felt, N. Y. S. Mus. Bull. 97, p. 458, 1904.

(Original description from female. Only males of this species are at hand, including a male determined by Felt. It differs from the male of *culiciformis* by its smaller size, reddish-yellow mesonotum, sparser vestiture, the marginal scutellar setae are reduced to a single row; conspicuously smaller wings; penultimate flagellar joint not twice as long as preceding joint and but little longer than last joint; tenth sternite much shorter, clear hyaline, very little curved; apex less pointed; side piece more slender; clasper more elongate, constricted slightly medianly and thickened apically.

DISTRIBUTION IN AMERICA

Massachusetts: Mt. Tom, May 14, 1903 (F. Knab).

Springfield, July 18, 1903 (F. Knab).

New York: Moody, August, 1904 (H. G. Dyar).

Big Chief, June 15, 1905 (E. P. Felt).

Corethra cinctipes Coquillett.

Corethra cinctipes Coquillett, Canad. Ent., vol. xxxv, p. 190, 1903.

A yellowish brown species with mottled wings and banded legs. Tenth sternites of male stouter and more curved than in *culiciformis*.

DISTRIBUTION IN AMERICA

Virginia: Mt. Vernon, March 23, 1903 (W. V. Warner).

District of Columbia: Washington, May 19 (H. G. Dyar).

New Jersey: Lahaway, March 28, 1903 (J. T. Brakeley).

New York: Karner, May 10, 1904 (E. P. Felt).

Connecticut: (Check-list, Britton).

Massachusetts: Springfield (F. Knab).

New Hampshire: Franconia (A. T. Slosson).

Dublin (A. Busck).

Corethra cinctipes obscura new variety.

A series of males and females of this form were reared from a large lake which goes dry in summer, at Hoodsport, Washington, May 2-8, 1924 (H. G. Dyar). The larvae occurred among logs in shallow water near one end of the lake, associated with *Aedes cinereus* Meigen. The adult differs from the eastern United States form by being of an uniformly smaller size and general darker color.

Type, No. 27456 U. S. Nat. Mus.

Genus **Chaoborus** Lichtenstein

Chaoborus Lichtenstein, Wiedemann's Arch. Zool., i, 174, 1800.

Sayomyia Coquillett, Canad. Ent. xxxv, 190, 1903.

Corethra, Auctorum.

Small to fairly large sized species, with or without markings on wings or legs. Basitarsal joint longer than following joint; anterior margin of mesonotum with pair of small oval, gran-

ulose areas; wings without tuft of setae at juncture of alar lobe and upper squama; setal arrangement and venation as in *Corethra*. Male clasp without claw; sidepiece with or without lobe.

Genotype, *Tipula crystallina* De Geer.

The larvae are aquatic, predaceous, without breathing tube, but rest horizontal at various depths in the water, nicely balanced by the pair of air-bladders in each end (Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., i, Plate viii, facing p. 168, figs. 1 and 2, 1912). The air-tubes of the pupae are closed, but filled with air, serving to hold the pupae vertical in the water.

TABLE OF SPECIES OF CHAOBORUS.

Wings spotted or clouded; bifurcation of second vein distinctly distad of fork of fourth vein.

Hind marginal wing fringe nearly as long as width of wing between cubitus and hind margin; mesepimeral setae five or less, male side piece usually with lobe.....subgenus *Sayomyia* Coquillett

Wing with many small spots.

Femora and tibia with numerous distinct spots,

punctipennis Say

Femora and tibia without distinct spots except at bases and apices.

Side piece of male with lobe (California),

astictopus new species

Side piece of male without lobe (Eastern U. S.),

albatus Johnson

Wing with faint cloud on cross veins.

Fore tarsi entirely pale.....*antillum* Knab

Fore tarsi with well marked apical rings,

festivus new species

Hind marginal wing fringe less than half distance between cubitus and hind margin; male without lobe on side piece,

subgenus *Schadonophasma* new subgenus

trivittatus Loew

Wings without spots or clouds; bifurcation of second vein opposite that of fourth vein; male without lobe on side piece,

subgenus *Chaoborus* Lichtenstein

Mesonotum with dark longitudinal bands.

Tenth sternites of male broadly rounded apically with sharp pointed preapical projection below.....*crystallina* De Geer

Tenth sternites basal three-fourth parallel sided, apical fourth pointed*eluthera*, new species

Mesonotum with yellowish red longitudinal bands; tenth sternite narrowing apically, claw-like.....*albipes* Johannsen

Chaoborus (Chaoborus) crystallina De Geer.

Tipula crystallina De Geer, Hist. des Insects, vi, 386, 1776.

Tipula pilicornis Fabricius, Mantissa Ins., ii, 325, 49, 1787.

Tipula hafniensis Gmelin, Syst. Nat., v, 2826, 1792.

Tipula plumicornis Fabricius, Ent. Syst., vi, 246, 1794.

Corethra fusca Staeger, Naturhist. Zidsskr., ii, 556, 1839.

Corethra plumicornis, var. *americana* Johannsen, N. Y. State Museum Bull. 68, 1903.

Sayomyia rotundifolia Felt, N. Y. St. Mus. Bull. 79, 336, 1904.

Sayomyia americana Felt, N. Y. St. Mus. Bull. 79, 368, 1904.

Sayomyia hudsoni Felt, N. Y. St. Mus. Bull. 79, 371, 1904.

A medium sized species with unspotted wings and legs and long basitarsal joint. Mesonotum with four longitudinal brownish stripes, tending to be reddish in the female and black and more or less confluent in the male; lateral margin of mesonotum with whitish yellow stripe which contrasts with the darker disc. Vestiture bright yellow, dark brown on thoracic dorsum of male; marginal scutellar setae numerous and in several irregular rows; bases of forked veins opposite each other; crossveins tending to lie in line; tip of Cu_2 directed forward, parallel with wing margin. Male: side piece without lobe; tenth sternite flat, much broadened apically, with well rounded margin and with a preapical, stout, sharp pointed projection on ventral margin.

The larvae are found in woodland pools.

Chaoborus crystallina De Geer, like *Corethra culiciformis* De Geer, is perhaps holarctic in distribution and is apparently a very variable species as is evidenced by its numerous synonyms.

DISTRIBUTION IN AMERICA

Massachusetts: Springfield (Dimmock).

New Hampshire: White Mountains (Morrison).

Franconia, (A. T. Slosson).

Maine: S. W. Harbor, July 13, 1918 (C. W. Johnson).

Michigan: Detroit (H. G. Hubbard).

South Dakota: Waubay, June 6, 1918 (J. M. Aldrich).

Missouri: Kansas City, March 30, 1899.

Chaoborus crystallina fusca Staeger.

This form appears to be a dark variety of *crystallina*. The specimens at hand are nearly black.

DISTRIBUTION IN AMERICA

Colorado: Grand Lake, May 31, 1923 (H. G. Dyar).

Chaoborus (Chaoborus) eluthera, new species.

Male and female: Very similar to *crystallina*, with same type of thoracic coloration, dark mesonotal disk with contrasting yellow lateral margin. The abdomen of the male is much more elongate and slender, the tergites appearing twice as long as broad (but little longer than broad in *crystallina*). The female is of a uniform paler color. Male with clasper more slender and rounded apically; eighth tergite, surface view, with well developed triangle shape, apex caudad; tenth sternites, basal three-fourths with distinct angle and parallel side, apical fourth suddenly constricted and tapering to a point.

Types, four males, No. 27457 U. S. Nat. Mus.; Sandpoint, Idaho, July 3, 1917 (H. G. Dyar); Potlatch, Idaho, June 20, 1907 (J. M. Aldrich); Pullman, Washington, April (J. M. Aldrich); Seattle, Washington, June 17, 1917 (H. G. Dyar).

The latter specimen has somewhat atypical sternites; the apical part is more rounded and sharply pointed.

Four females also from Potlatch, Idaho.

Chaoborus (Chaoborus) albipes Johannsen.

Chaoborus albipes Johannsen, N. Y. State Museum Bull. 68, 368, 1903.

Chaoborus albipes Felt, N. Y. State Museum Bull. 79, 363, 1904.

The adult of this species differs from *crystallina* chiefly by its lighter, pale orange color and more delicate appearance. The tenth sternites of the male taper to a sharp point, being claw-like in appearance.

C. albipes may eventually prove to be the European species, *flavicans* Meigen. It is very similar in coloration and apparently bears the same relation with *crystallina* in this country as *flavicans* bears to *crystallina* in Europe. As we do not possess European males of *flavicans*, and the hypopygium of

the male has not been described, we are unable to determine this point at present.

DISTRIBUTION IN AMERICA

Massachusetts: Forest Hills, August, 1912 (Recorded C. H. Richardson).

New York: Ithaca, August, 1901 (Recorded O. A. Johannsen).

Bath-on-Hudson, June (Recorded E. P. Felt).

Clifton Springs, August 31, 1905 (E. P. Felt).

New Jersey: Delair, September 22, 1904.

Maryland: Plummer's Island, June 21, 1903 (W. V. Warner).

Chaoborus (Schadonophasma) trivittatus Loew.

Corethra trivittatus Loew, Cent., ii, 1, 1862.

Corethra punctipennis Giles (not Say), Handbook of Gnats, 2nd ed., 502, 1902.

A fairly large species with mottled wings and legs and long basitarsal joint. Mesonotum pale yellow with four reddish brown to black longitudinal stripes.

Wings variegated with light and dark spots; upper forked vein with bifurcation distinctly distad of lower one; tip of Cu_2 curved forward and running parallel with wing margin. Femora ringed at apices, the tibiae at bases and apices, tarsi darkened except on basal two-thirds of basitarsal joint; fore trochanter and base of fore femora more or less darkened. Male with tenth sternites nearly transparent, ellipsoidal in shape, with a large, rather obtuse recurved, subapical projection on ventral margin, side piece without lobe.

Larvae found in cold woodland pools and springs. This species is widely distributed in North America.

DISTRIBUTION IN AMERICA

New York: Elizabethtown, June 9 (E. P. Felt).

Massachusetts: W. Springfield, October 7, 1903 (F. Knab).

New Hampshire: Center Harbor, Aug. 23, 1902 (H. G. Dyar).

Maine: (Recorded Herman Loew).

Alberta: Banff, July 24, 1918 (H. G. Dyar).

British Columbia: Prince Rupert, May 13, 1919 (H. G. Dyar).

Alaska: Yukon River (Recorded Osten Sacken).

Washington: Bremerton, May 2, 1924 (H. G. Dyar).

Hoodspout, May 6, 1924 (H. G. Dyar).

California: Stanford University, March, 1903 (I. McCracken).

Chaoborus (Sayomyia) punctipennis Say.

Corethra punctipennis Say, Jour. Aca. Sci., Phila., iii, 16, 1823.

Rather small (about 4 mm.) pale yellow species with numerous spots on wings and with legs thickly spotted; basitarsal joint long. Mesonotal longitudinal markings nearly concolorous with rest of mesonotum, sometimes grayish; wings with black spot on forks and tips of all the veins; base of fork of second vein distinctly distad of base of fork of fourth vein; tip of Cu_2 curved forward and running parallel with wing margin; sides of abdomen with numerous small black spots; femora and tibiae thickly spotted; tips of all the tarsal joints dark ringed. Male with short obtuse lobe on side piece bearing a number of spine-like hairs; two or three irregular rows of setae extending lengthwise of side piece between lobe and base. Tenth sternite with nearly parallel but irregular sides, apex truncate but appearing hollowed out. Apparently a common species in the eastern half of North America.

DISTRIBUTION IN AMERICA

Quebec: Kingsmere, July 18, 1919 (R. H. Chrystal).

New Hampshire: Franconia (A. T. Slosson).

Center Harbor, 1902 (H. G. Dyar).

New York: Chautauqua, July, 1916 (R. W. Stoodly).

Maryland: Plummer's Island, May 21, 1902 (H. S. Barber).

Great Falls, July 12, 1905 (O. Heidemann).

District of Columbia: Washington, August 13, 1912 (R. C. Shannon).

Florida: Jacksonville, March, 1905 (H. G. Dyar).

Estero, March 7, 1906 (J. B. Van Duzee).

Lake Okeechobee, March, 1906 (J. H. Egbert).

Illinois: Urbana, Oct. 10, 1904 (F. Knab).

Missouri: St. Louis, May 12, 1904 (W. V. Warner).

South Dakota: Waubay, June 6, 1918 (J. M. Aldrich).

Colorado: Boulder, August, 1917 (T. D. A. Cockerell).

Chaoborus (Sayomyia) astictopus, new species.

Male and female. Very similar to *punctipennis* in its pale yellowish, delicate appearance and size but without definite spots on femora and tibiae except for the dark basal and apical rings; tergites with large blackish lateral spots just before the middle which nearly merge to form cross bands. Lobe of side piece with two spine-like hairs; tenth sternites similar to those of *punctipennis*.

Ten specimens; type, male, No. 27458, U. S. Nat. Mus.; East Lake, California, June 21, 1883 (Turner); females, Clio, California, July 23, 1916 (H. G. Dyar); Palo Alto, California, August 8, 1904 (J. M. Aldrich).

Chaoborus (Sayomyia) albatus Johnson.

*Chaoborus albatu*s Johnson, occasional papers Boston Soc. Nat. Hist. v, 11, 1921.

Mr. C. W. Johnson very kindly sent a specimen of his species. It agrees in appearance and color with *astictopus*, but the side piece of the male lacks the lobe while the tenth sternites have smooth sides and are curved and sharply pointed apically.

DISTRIBUTION IN AMERICA

Massachusetts: Brookline, June 18 (C. W. Johnson).

Mt. Tom, July 14, 1907 (C. W. Johnson).

Chaoborus (Sayomyia) antillum Knab.

Chaoborus antillum Knab, Ins. Ins. Mens., i, 121, 1913.

A small, pale yellow species with long basitarsal joint, numerous rings on femora and tibiae, apical rings on joints of fore tarsi absent, present but faintly brown on apices of tarsal joints of mid and hind legs; wings with brown at the forking of fifth vein and beyond the crossveins, the latter cloud forming a wavy indistinct band across the wing; fringe nearly as long as distance between cubitus and wing margin. Male with well developed lobe on side piece which projects thumb-like; a row of downward curved setae present beginning at apex of lobe and extending down the inner margin of side piece; tenth sternites long narrow, obtusely rounded apically and with a very

prominent sharply pointed projection, directed parallel with remainder of sternite.

DISTRIBUTION IN AMERICA

Cuba: Santiago de los Baños (J. H. Pazos).

Chaoborus (Sayomyia) festivus, new species.

Male and female. Very similar to *antillum* in its small, pale yellow, delicate appearance. Differs chiefly in its well defined tarsal rings and male genitalia. Tenth sternites of male parallel sided until towards apex, then suddenly constricted and tapered to a sharp point; no dorsal projection as in *antillum*.

Type, No. 27458, U. S. Nat. Mus.; Matachin, Canal Zone, Panama, June 2, 1908 (A. H. Jennings).

Genus **Corethrella** Coquillett

Corethrella Coquillett, Journ. N. Y. Ent. Soc., x, 191, 1902.

Very small species with spotted wings and without distinct leg markings. Antenna much longer than length of fore femur; clypeus subquadrate; dorsal prothoracic sclerite absent; mesonotal setae strongly developed; proepimeral setae reduced to two to three; prealar and sternopleural setae absent; mesepimeral setae present; a single row of marginal scutellar setae; basitarsal joints longer than their following joints; male abdominal segments all shorter than broad; tip R_1 much nearer tip of Sc than to R_2 ; radial sector forking near middle of radius; fringe on hind wing margin as long as distance between wing margin and cubitus; claspers without claw.

TABLE OF SPECIES OF CORETHRELLA

Radial sector forking at middle of radius.....*brakeleyi* Coquillett
Radial sector forking beyond middle of radius..*appendiculata* Grabham

Corethrella brakeleyi Coquillett.

Corethrella brakeleyi Coquillett, Journ. N. Y. Ent. Soc., x, 191, 1902.

A very small (1.5–2 mm.) dark species. Thorax dark brown, mesonotum with broad longitudinal stripes and similarly colored spots near anterior corners; veins on anterior half of wings

darkened at basal third and basal two-thirds; radial sector (basal section) forking at middle of radius; nearly straight and longer than distance between tips of R_2 and R_3 ; fringed darkened at tip of wing; femora and tibiae darkened, the femora yellowish at apex; abdomen dark brown with numerous yellowish hairs.

Side piece of male with longitudinal setae on inner marginal line; below and between the two basal setae is a long spine-like seta; clasper long, of moderate thickness, a very small seta on inner margin near base; tenth sternites apparently absent.

The larvae live in cold springs, pools and bogs.

DISTRIBUTION IN AMERICA

New Jersey: Lahaway, August, 1904 (J. T. Brakeley).

Maryland: near Plummer's Island, October 10, 1914 (R. C. Shannon).

Corethrella appendiculata Grabham.

Corethrella appendiculata Grabham, Ent. News, 17, 343, 1906.

Male and female. A small (1.5–2 mm.) dark colored species, very similar to *brakeleyi*. Differs in venation and male genitalia. Radial sector forking beyond middle of radius, irregularly but distinctly curved, shorter than distance between tips of R_2 and R_3 . Side piece of male with an irregular row of smaller setae in addition to the row of five in line with the spine-like seta which is shorter than in *brakeleyi*; seta near base of clasper much longer. Larvae have been found in tree holes and bamboo joints.

DISTRIBUTION IN AMERICA

Jamaica: Kingston (M. Grabham).

Santo Domingo: San Francisco Mountains, September, 1905 (A. Busck).

Panama: Tabernilla, Canal Zone, July, 1907 (A. Busck).

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